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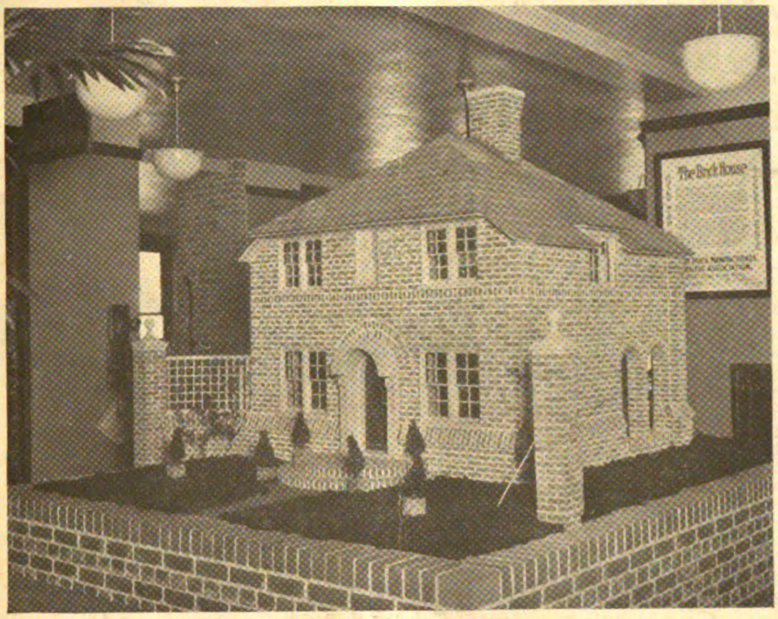
The International **FIRESAFE** Building Publication

# CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF FIREPROOFING MATERIALS & PROTECTIVE DEVICES



An interesting minature brick house which serves as a valuable publicity medium

### *Special Departments*

- *Automatic Sprinklers*
- *Gypsum*
- *Insurance*
- *Legal*
- *Portland Cement*

Vol. IV JANUARY, 1917 No. 1

*Fire Prevention on Docks and Wharves.*
*Reducing Fire Insurance Rates of Cities.*
*The Progress of Safe Home Building.*
*The Greatest Building Show in History.*
*Consistent Control of Conflagrations.*
*Homes for the Industrial Class.*

WITH A DEPARTMENT DEVOTED TO

Price 20 cents **SAFE HOMES** $2.00 Per Annum

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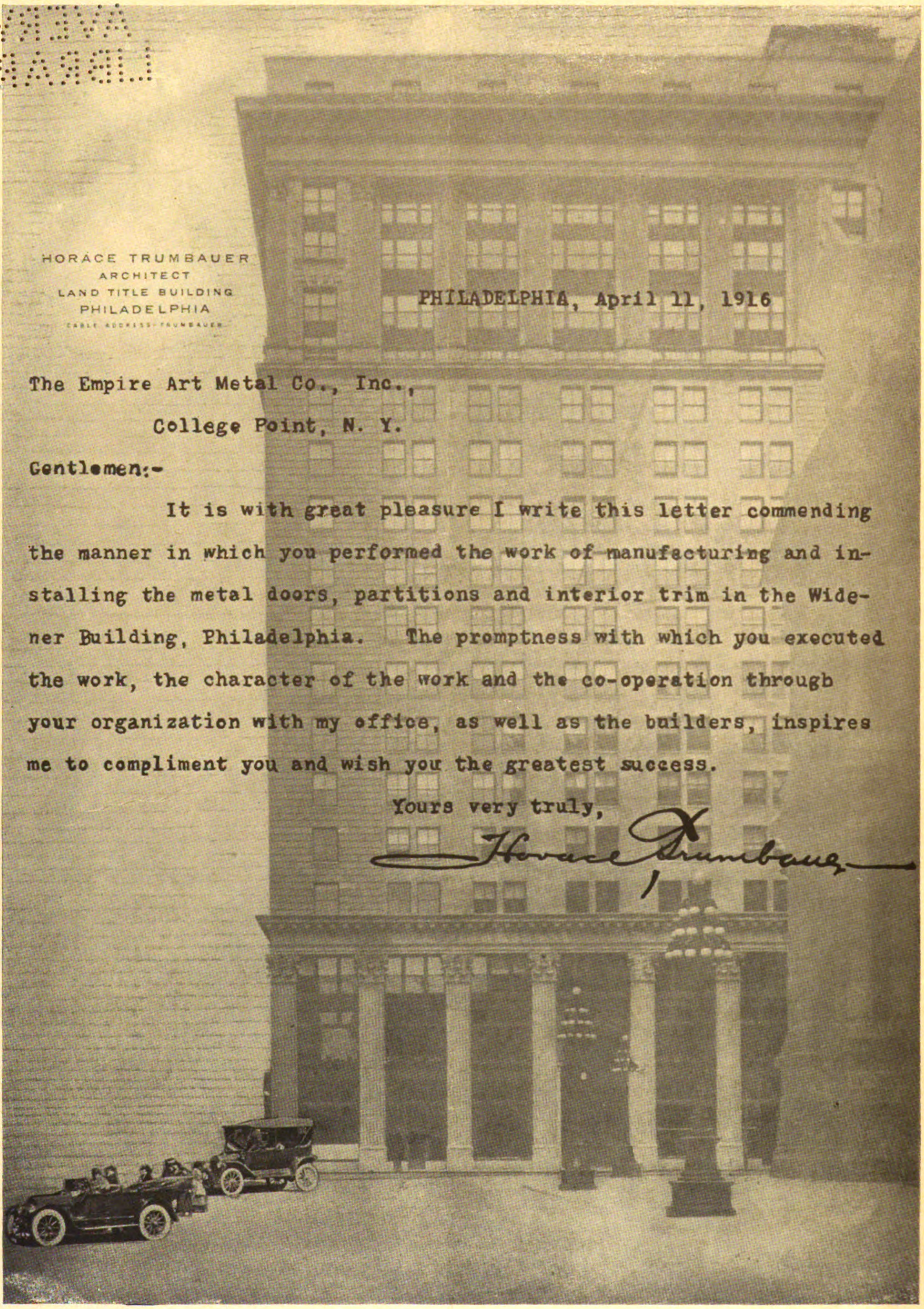


HORACE TRUMBAUER
ARCHITECT
LAND TITLE BUILDING
PHILADELPHIA
CABLE ADDRESS-TRUMBAUER

PHILADELPHIA, April 11, 1916

The Empire Art Metal Co., Inc.,
College Point, N. Y.

Gentlemen:-

It is with great pleasure I write this letter commending the manner in which you performed the work of manufacturing and installing the metal doors, partitions and interior trim in the Widener Building, Philadelphia. The promptness with which you executed the work, the character of the work and the co-operation through your organization with my office, as well as the builders, inspires me to compliment you and wish you the greatest success.

Yours very truly,

Horace Trumbauer

STATE ARMORY, AKRON, OHIO
STEEL-TILE FLOORS
*Architect:*—KARL I. BEST, State Architect
*Contractors:*—CLEMMENS & JOHNSON, Hicksville, Ohio

# Fireproof Floors

GF STEEL-TILE floors have many exclusive advantages—they are sanitary and fireproof, and mean substantial, durable construction. And this with only a slight increase in initial cost over wooden floor construction, which is more than offset in a short time by reduction of maintenance, expense and insurance rates.

GF Steel-Tile

are permanent steel forms by which a series of T-beams (see cut below) connected by a thin slab of concrete are formed, which safely carry all loads to their bearings. Occupying that part of a heavy reinforced concrete floor which is unnecessary to strength, they save from 35 to 50 per cent. in concrete, yet without sacrificing load carrying capacity.

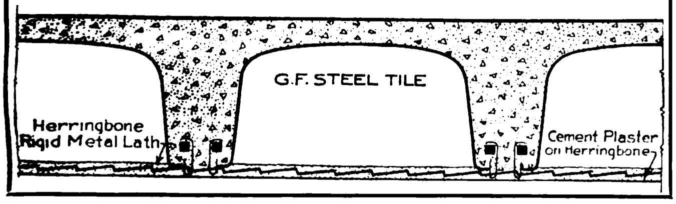
But the saving does not end here; lighter floors mean lighter supporting members through to the footings of the structure.

Only a simple shoring is required under each joint; the Steel-Tile are actually forms and carry all the concrete except the narrow joist.

Learn more about the uses of GF Steel Tile.

**GET THE STEEL-TILE HANDBOOK** giving general specifications for reinforced concrete, working formulas for reinforced concrete design, and tables of safe loads for floors.

**THE GENERAL FIREPROOFING CO.**
**802 Logan Ave., Youngstown, Ohio**



# How Much Fuel Are Your Windows Wasting?

You can secure (at least for a time) fire-safety by installing cheap, "leaky" fire retardant windows in your building. But how much fuel will you waste in a year, due to the escape of heat through these windows?

## POMEROY

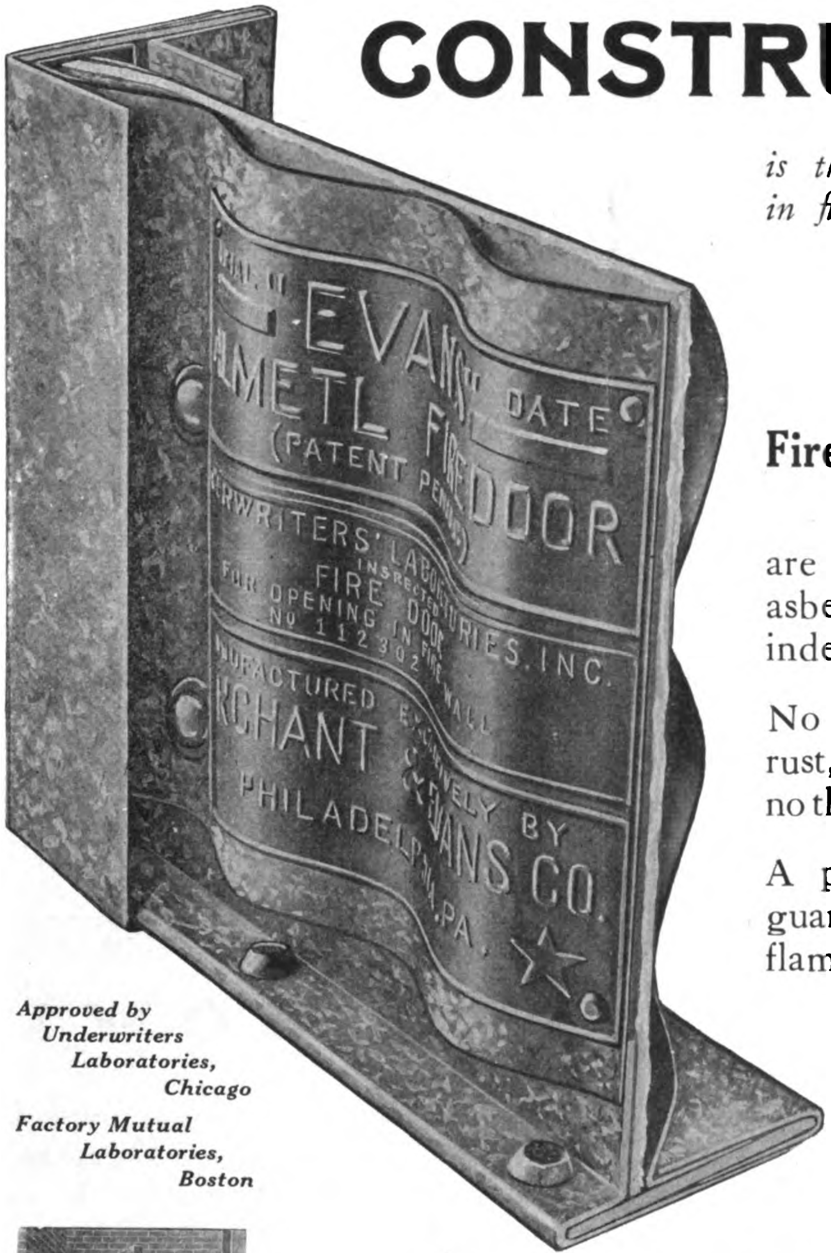
### Hollow Metal Fire Retardant

## Windows

Are so thoroughly well made, so perfectly fitted, so superior in weather qualities, that the saving in fuel they bring about makes them the least expensive windows that an owner can install, even at a higher first cost. In **Pomeroy** Windows you get maximum fire-safety and maximum fuel economy. Both of these contribute to the earning power of a building.

Let us send you the literature
on Pomeroy Protection.

**S. H. POMEROY**
**COMPANY, INC.**
**30 EAST 42ND STREET NEW YORK**



CONSTRUCTION

*is the essential requirement in fire prevention appliances*

**EVANS "ALMETL"**

**Fire Doors and Shutters**
**Patents Pending**

are of rigid, all-steel and asbestos, non-warping, and indestructible construction.

No wood to rot, no tin to rust, no seams to open and no thin tin covering to bruise.

A permanent and efficient guard against the spread of flames.

**Absolutely the best building opening covering now on the market.**

*Approved by Underwriters Laboratories, Chicago*
*Factory Mutual Laboratories, Boston*

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Fire Retarding "Star" Ventilators
Merchant's Metal "Gothic" Shingles
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"Merchant's Old Method" Roofing Tin

**1866—MERCHANT & EVANS COMPANY—1916**

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*NEW YORK* *WHEELING* *BALTIMORE* *CHICAGO* *ATLANTA* *ST. LOUIS* *CLEVELAND* *KANSAS CITY*

*The International* FIRESAFE *Building Publication*

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New York, N. Y.
C. Stanley Taylor, Sec.-Treas.

Entered as second-class matter November 3, 1915, at the post office at New York, under the Act of March 3, 1879.

The building laws of many states recognize plaster over metal lath as suitable construction for fire resisting stair soffits and walls in factories, stores, etc.

**Kno-Burn**
TRADE MARK
**Expanded Metal Lath**

is the *standard* lath for all types of construction. Its fine mesh cuts down the amount of plaster. Its smooth surface is easy and quick to plaster over. Its mesh keys the plaster firmly and permanently to it.

Let us send you complete data on our full line. Ask for Booklet 583.

**North Western Expanded Metal Co.**
***Manufacturers of all types of Expanded Metal***
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*. . The . .*

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*BRICK and TILE*

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***"The Largest Fire Insurance Company in America"***

**ORGANIZED 1853**

ELBRIDGE G. SNOW, President

**"Service" in Fire Insurance**

**Fire Insurance, as issued by THE HOME INSURANCE COMPANY OF NEW YORK, means something more than Indemnity for Loss or Damage due to Fire and other causes.**

**It means a " SERVICE " to Policy-holders which is unexcelled. The Company's equipment includes:**

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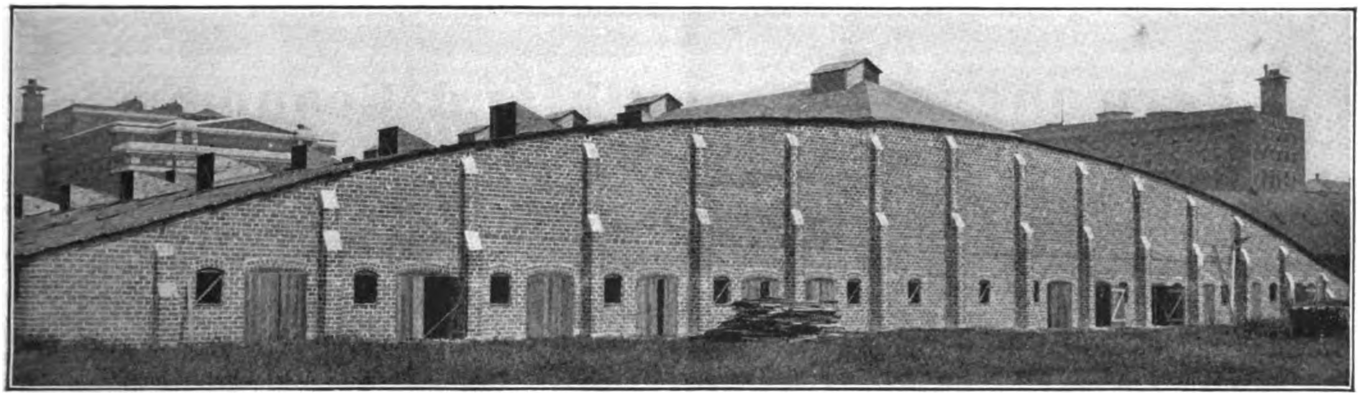

# *Billy Sunday Played Safe!*

In fact, he had to! The Board of Building Commissioners of Boston refused pointblank to grant a permit for a frame structure. 15,000 persons were to be accommodated at one time in this greatest of Billy Sunday's tabernacles — and the city fathers were taking no chances on their people's safety. They eliminated all fire dangers, guarded against any possible development of structural weakness, and made the vast auditorium absolutely safe, with

# NATCO

## *Erected in 21 working days!*

All the walls and piers were built of Natco Hollow Tile, with interior supports of steel up to the height of 7 to 12 feet. Thus the great tabernacle was made not only proof against fire, but its interior also was kept dry, sanitary and warmer.

The building had to go up in a hurry. With Natco, the contractors were able to complete construction within twenty-one working days! — and do it with thoroughness and astonishing economy. This feat is remarkable when the size of the structure (302 x 250 feet) is considered.

Natco is utilized everywhere in every form of the most modern building construction. And wherever Natco and Natco Service are used, their advantages are appreciated. Any Natco office will gladly give you complete information.

**NATIONAL·FIRE·PROOFING·COMPANY**
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*23 Factories in the United States*

NATIONAL FIRE PROOFING COMPANY
OF CANADA, Ltd.
Office at Toronto and
Factory at Hamilton, Ontario, Canada

*Interior and Exterior Construction Views of the Billy Sunday Tabernacle in Boston*

**Permanency, Strength and Economy**

IN THESE DAYS of exacting requirements, buildings must be erected to conform to these vital factors. You can meet them most effectively by specifying

**BERGER'S**

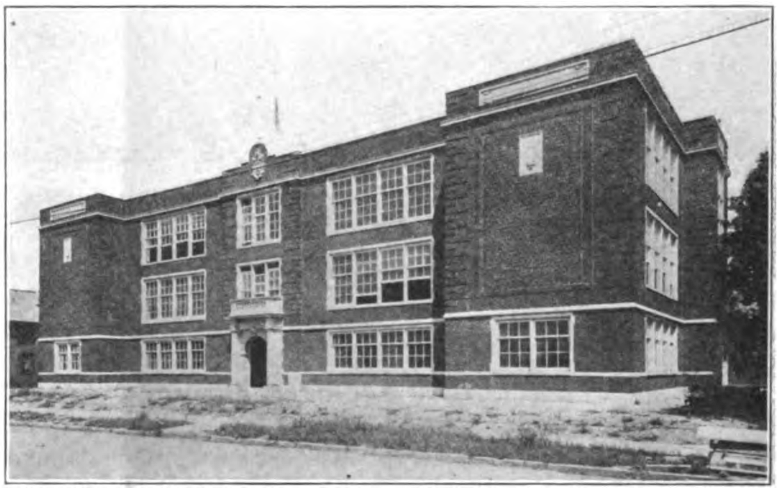
*Metal Lumber*

(Patented)

for the floors, partitions and roofs of your buildings.

These pressed steel joists make a *fireproof* and *indestructible* construction at less cost than any other. For the same strength, the floor, compared with any other fireproof construction, will weigh approximately 50% less.

Berger's Metal Lumber is proof against rodents, dampness and sound; eliminates maintenance costs; reduces insurance rates; is easily and quickly erected in winter as well as summer; and is adapted to any interior.



Henry S. Martin School, Canton, O. Berger's Metal Lumber used for floors, partitions and roof.
Frank L. Packard, Architect; Indiana Engineering and Construction Co., General Contractors.

*See Sweet's, pages 220-227—and write for Technical Bulletin L. C.*

**The Berger Manufacturing Company, Canton, Ohio**

*Branches:* Boston New York Philadelphia Chicago St. Louis Minneapolis San Francisco
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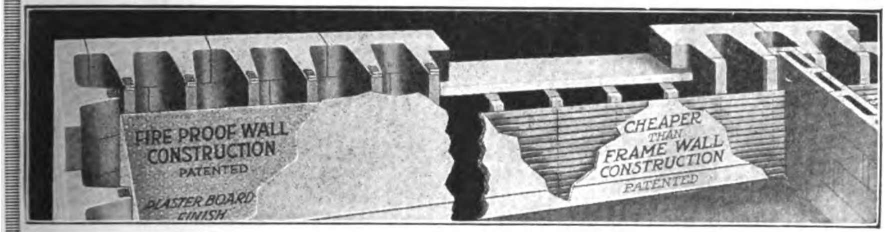
# Synstone Products *The Last Word in Concrete Construction*

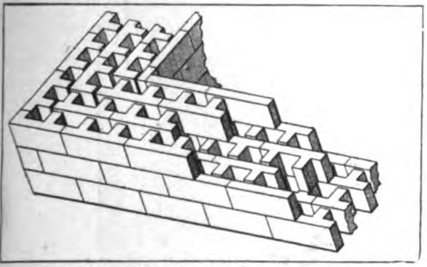
Wet Process, making real concrete walls impervious to heat, cold and moisture, fire proof and everlasting. Hollow Concrete Walls, stronger than brick, faced with beautiful natural materials—crushed granite, marble or sands—with all the sparkle and life of natural stone. Brick or stucco facings may be used if desired. Blocks immediately removed from machine using a wet, soggy mixture 1 cement, 2½ sand, 4 parts of 1″ stone or gravel—producing stone withstanding 3,000 lbs. pressure per square inch and 1700 degrees of heat for two hours without injury.


FIRE PROOF WALL CONSTRUCTION
PATENTED
PLASTER BOARD FINISH
CHEAPER THAN FRAME WALL CONSTRUCTION
PATENTED

**50 blocks (100 sq. ft. of wall) made per hr. 30 to 75 sq. ft. laid per hour by one mason, two helpers.**

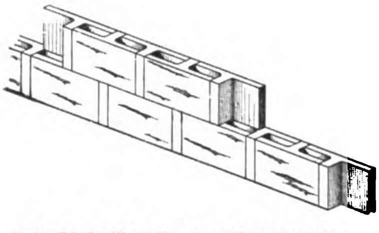
**Average cost per square foot of wall made and laid unfaced 11.4c faced 12.7c.**

**Synstone Single Wall for residences and any three-story construction, 9″, 10″, 12″ or 13″ thick. Half as much material and labor used in making, less than half as much time in laying, as any other wall. Inner wall wood lath and plaster, metal lath or plaster board. 9″ wall 50% hollow; stronger than 12″ brick wall, costing no more than frame construction in most places.**



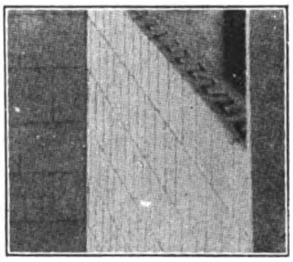
MULTIPLE AIR SPACE WALL

Synstone Wide Wall Construction (multiple air space). 50 blocks (100 sq. ft.) made per hour. Ideal construction for cold storage or packing houses. 19½″ to as many feet in thickness, as desired. Absolutely impervious to heat.



DOUBLE HEADER PARTITION WALL

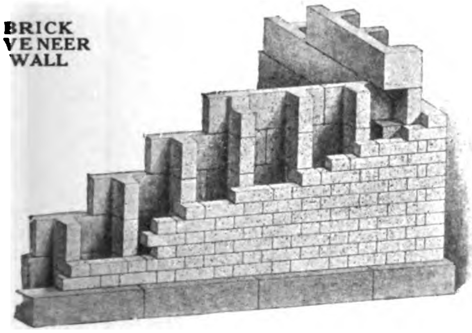
3″ to 12″ in thickness. Strongest masonry wall that can be constructed. 50 blocks (100 sq. ft. or 50 sq. ft. of wall) made per hour.



**DOUBLE SOUND-PROOF PARTITION WALL**

One or both sides may be faced, requiring no plaster, 4″ and up in thickness. 50 blocks (100 sq. ft. or 50 sq. ft. of wall) made per hour.

**BRICK VENEER WALL**

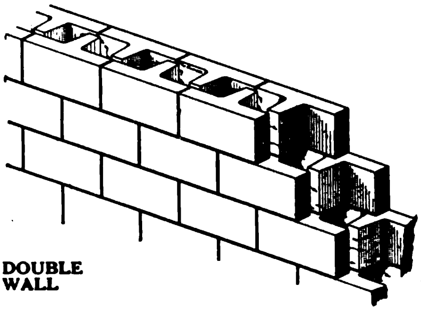


**50 blocks (100 sq. ft. of wall—inner wall) made per hour, and laid in one-third the time required for brick.**

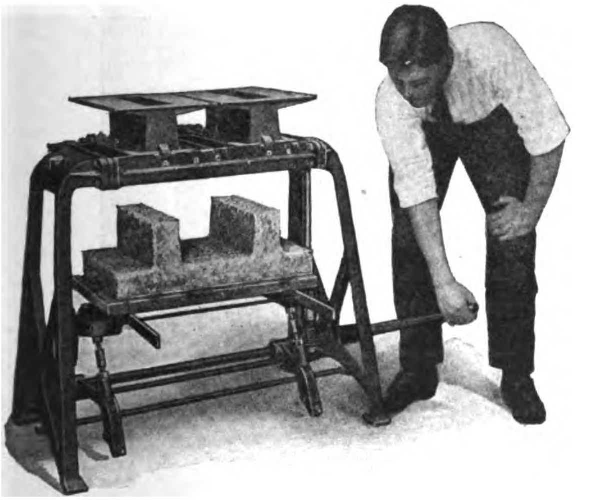
Synstone Inner Wall, with pressed or art brick facing, bonded together with header bond. Large saving in cost over solid brick construction, 12½″ or 16½″ thick.

**50 blocks (100 sq. ft. or 50 sq. ft. of wall) made per hour.**

Synstone Double Wall, for heavy construction, 11½ to 18″ in thickness, 33⅓% to 50% hollow. Large saving in cost over brick walls.



**DOUBLE WALL**

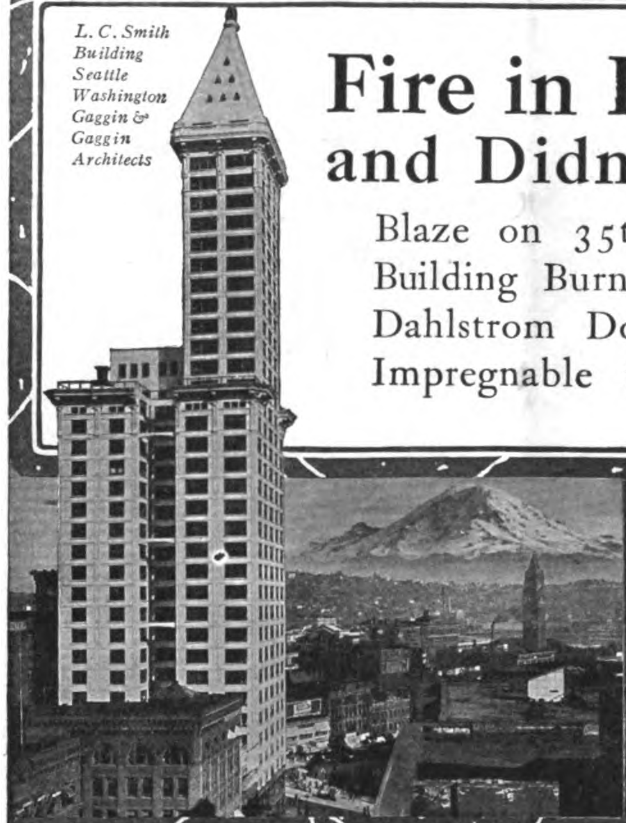


SYNSTONE MACHINERY is very carefully made and thoroughly complete in every detail, making all these walls and the different shapes and sizes of blocks required for them, by simply changing the cores, which is done in thirty seconds. Operated by common labor, 1, 2 or 3 men. Above estimates (50 blocks, 100 sq. ft. per hour) are based upon 2 men with mixture supplied to them.

PLANT. Just as good and beautiful material can be made in a shed as in an expensive factory. Do not let your material freeze or dry out. Keep moist for two weeks, when it is ready for the wall. Complete machinery C. I. F. New York $287.50, no royalty.

## The Ferguson Synstone Company

**Century Building, Denver, Colorado, U. S. A.**
**Cable Address: "SYNSTONE" Denver. Code—Western Union.**
**REFERENCES: Dun or Bradstreet Commercial Agencies or United States National Bank, Denver.**



**Fire in Pipe Shaft and Didn't Know It**

Blaze on 35th Floor of This Building Burns Out Unnoticed. Dahlstrom Door Again Proves Impregnable to Raging Fire.

**Door Finish Only Damage
Reverse Side Unblemished**

Gasoline, oil soaked waste, brooms, brushes and other inflammable material burned behind this door unnoticed, damaging only the side exposed to the flames as shown.
The janitor upon opening the door was surprised to find everything consumed. The wall tile showed effect of excessive heat. Draft in shaft intensified matters.
Quality as related to Dahlstrom Doors implies more than a good looking door of metal. Dahlstrom Quality is established on the basis of dependable service in the emergency of fire.
Your responsibility ends with the installation.

*Write for all the facts.*

DAHLSTROM PATENT DOOR
ARTISTIC EVERLASTING
SANITARY AND FIREPROOF

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Zahner Hollow Metal Doors and Trim are also installed thru the building

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*We are in position to take prompt care of any order without the least deviation from our usual high standard of quality.*

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CANTON

*Branches in all Principal Cities*

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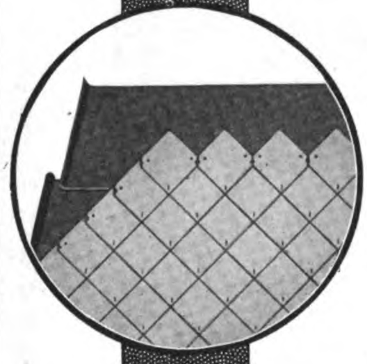

# The Glory that Once was Paris

Over night the work of a lifetime turned to ashes. Business built by generations gone down in ruin. The savings of countless families wiped out in a few hours. Treasures that insurance can never replace lost forever. On the night of March 21, 1916, a spark from a locomotive fell upon some combustible material in Paris, Texas. In a few minutes sparks were falling upon wood-shingled roofs nearby. In a few hours 60% of the city was a furnace. The blame for this $10,000,000 fire is placed by the State Fire Marshal *squarely upon shingle roofs in the city.* Had these roofs been of

## AMBLER
## Asbestos Shingles

the fire department could have held the blaze where it started. Just concrete-plus-asbestos—yet a roof that *laughs* at burning brands, because it is fireproof. It is expense-proof, too. A roof of Ambler Asbestos Shingles lasts as long as the walls stand, always look like new and never costs its owner one cent for painting or repairs. Is the glory that is, or will be, *your* buildings protected by Ambler Shingles?

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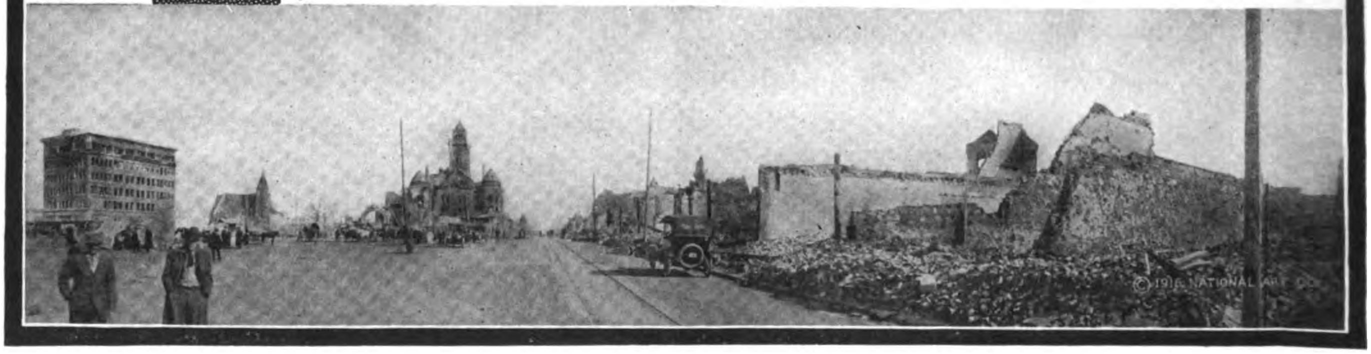


CONSTRVCTION
ADVOCATING THE CONSISTENT VSE OF FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. IV JANUARY, 1917 No. 1

# *Reducing the Fire Insurance Rates on American Cities*

## *A Discussion of the Logical Benefits to be Derived from a Careful Study of Municipal Fire Hazards and the Application of Business Methods to Civic Administration*

TREATING the subject of civic administration as an ordinary business matter, and applying those methods of executive efficiency which have proven successful in ordinary business ventures, would seem to be the only logical plan of municipal government, particularly in its relation to the fire hazard and the reduction of insurance costs.

While such administration methods may seem logical, their application to city planning and city government is far from general in this country; and the success of one such venture, that of Joliet, Ill., is therefore well worth careful analysis.

City officials and all others interested in bettering local conditions, rendering the city a more attractive and safer place of abode, and reducing the actual cost of owning property therein, will find in this analysis an excellent working plan for local civic betterment.

From the Hon. H. E. Wood, ex-Mayor of Joliet, the following information and data have been obtained. Without entering into a discussion of the disorganized, lax and dangerous conditions which existed in that city prior to his administration, conditions which exist to-day in almost every American city, the matter of reorganization and the application of remedial measures will be taken up.

### *Fire Insurance a Business Proposition*

The new administration faced the herculean task of reorganization of the entire city along business lines. The fire insurance question was approached as a business proposition on the theory that fire insurance companies had something to sell the city which it was well nigh necessary that the city buy; that the price of fire insurance in the municipality depended, first, on the ability of the city to prevent fire, and, second, on the ability to extinguish fires once started; that the sale of the commodity of insurance was based upon exactly the same rules that govern the sale of any other commodity, and to cheapen that commodity the city must bend its efforts to systematically prevent fires and should a fire once start to have ever ready the efficient means of extinguishing the flames.

### *Combining Departments for Efficiency*

To prevent fires almost every department of the city must combine in efficiency in service in order to accomplish results. First-class men were put in charge of electric wiring and plumbing. At first the opposition was almost insurmountable, but as special insurance fees for defective wiring began to decrease and disappear, the merchants and business men caught the spirit and in less than a year and a half all special rates disappeared and there was scarcely a building that was not wired with approved standard work and material.

### *Enforced Cleanliness Reduces Fire Waste*

In the street-cleaning and garbage collection department an efficient, up-to-date business man was given the entire charge and responsibility. The throwing of waste paper and other inflammable material into the streets and alleys was placed under strict regulation. Alleys and alley casements and stairways were thoroughly cleaned and so regulated that they were kept clean. The accumulation of dirt, debris and other combustible material was stopped. The public streets and public places of the city were made clean. Fires from spontaneous combustion and matches or cigarettes thrown into alleyways became a thing of the past.

### *Good Streets Necessary*

A comprehensive plan of street improvement was adopted. Main artery streets leading from the central business district into all parts of the city were paved and placed in first-class condition. The fire department could answer any alarm at full speed into any section. Deliveries by merchants could be easily made in any part of the city, and people could get down town with greater facility. Thus this improvement was easily financed and the benefits were manyfold.

### *Backing Prevention by Police Power*

The police department was placed squarely upon a strongly efficient civil service basis. The most efficient man for the position regardless of politics was made chief. His only orders were "Efficiency and Service." He had the entire charge and responsibility of the department. Order and discipline appeared out of chaos. "Slackers" and incompetents faced the Civil Service Commissioner and were either raised to standard or dropped from the force. Co-operation between the police, fire and street departments was established. The enforcement of health and cleanliness was undertaken by the police and no inconsiderable service rendered to the city in preventing incendiary fires and keeping alleyways and public places free from papers and rubbish.

### *Fire Prevention Taught in Schools*

A system of "Safety First" lessons was installed in the schools. Among lessons teaching precautions as to personal safety there were introduced municipal lessons. One was carefully prepared by the police chief, one by the city electrician, and one by the fire chief. The lesson by the fire chief treated mainly on how fires started in homes and how to prevent them. The causes of spontaneous combustion in closets and among debris in outbuildings and attics were explained to the children. The fire chief advised that all chimney flues be examined at least twice a year. The children were urged to carry these lessons into immediate effect and to report on the condition of chimneys, pipes, stoves and furnaces in their homes and cleanliness of their alleyways and premises. This action resulted in general repairs in almost every home in the city and a reduction of fires from these causes of almost 60 per cent the first year. In these "Saftey First" lessons the children were taught to notice conditions which might cause fires, who was responsible therefor and who should have the condition obviated, how to call the fire department, and to assist them in finding the fire once called. In other words, the entire youth of the city was organized into a fire prevention association reaching into every house, alley and secret place of the city.

### *Children Made Fire Preventionists*

Too much cannot be said of the training of children along fire prevention lines. As children, they observe every condition in every part of the city. As citizens, they are the coming generation, and if trained along right lines great strides will be taken in fire prevention in American cities within the next ten years. We thoroughly believe that in every city "Safety First" lessons should be taught in every school and that these lessons should contain studies on municipal safety and fire prevention as well as the personal safety and welfare of the children themselves.

The children were assisted and their interest excited by a system of fire drills and inspections by the chief of the fire department until the largest school could be emptied of children in less than a minute. Considerable rivalry among both teachers and pupils was aroused by making these of a competitive nature, and children displayed a lively interest in maintaining their discipline and speed in fire drills. The result aimed at and obtained was that the interest of children in matters relative to fire prevention and danger from injury was kept aroused and their co-operation in all matters in relation to their homes and home surroundings obtained through a lively rivalry among themselves and co-operation with the fire department.

### *Valuable Fire Department Inspection*

Monthly inspections by members of the fire department were made at irregular intervals of all downtown buildings. The inspecting fireman was furnished blanks for each building inspected, containing spaces for "suggested improvements," in which he reported any dangerous fire conditions found in the building. A copy of this report was left with the merchant and the original filed at the chief's office. If a dangerous fire hazard was found a time limit to repair was fixed and the fireman returned at the time specified. If the merchant still refused or neglected to remove the hazard his attention was called to the ordinances of the city, to the unfairness of subjecting his neighbor to an unnecessary fire hazard and to the efficiency and service the city was giving its people. No merchant, once it became known that the administration was on the square, even hesitated in repairing the difficulty, but willingly went farther than we could have required in keeping his store and basement clean. Had occasion required, our next appeal would have been to the State fire marshal. The inspecting firemen were constantly changed. This for threefold reasons: first, it varied the generally monotonous life of a fireman; second, it prevented favoritism and failure to report inflammable material, debris in basements and other temporary troubles; and third, inspection of downtown buildings by many firemen gave an intimate knowledge of buildings and conditions to each fireman, and hence added efficiency in case of fire.

### *Inspection Training Saves Property*

One incident of the individual efficiency of the fireman obtained by his personal inspection of downtown buildings will suffice to illustrate. During a fire in a store building in the night-time the owner of the adjoining store had locked his building on the theory that a fire wall between the two buildings would entirely protect him. The assistant chief desired entrance, but was assured by the owner that the fire wall was sufficiently thick and of such construction that fire could not be communicated to his building. The assistant Chief had personally inspected the building and knew that in the third story near the roof certain joists had been allowed to protrude entirely through the wall. On gaining entrance he made his way immediately to this point and found that the fire had eaten through; and while he was able to extinguish it at the time with chemicals, yet in a few minutes it would have obtained such headway as to cause thousands of dollars of loss. Fire inspection of buildings is for the specific purpose of detecting possibilities of fire; and, in this instance, the fire chief demonstrated that he knew of this item of defective construction better than did the owner himself.

The inspection resulted generally in clean basements in our mercantile houses, many furnaces were repaired, flues cleaned and guarded, wiring renewed, fire doors installed, doors cut in garrets and blind hallways to facilitate access of firemen, opening of passageways in stockrooms and many other preventive measures.

### *Overhead Wires a Menace*

A policy of placing all telephone and electric wires underground in the congested district was urged. The service companies heartily co-operated and, with what had already been done in this line, in a year practically the entire downtown was rid of a network of overhead wires. This action was imperative. An intricate system of overhead wires stands as a menace to the lives of firemen, and may so seriously impede their work as to allow a conflagration to gain such headway as to cause thousands of dollars loss.

### *A Rigid but Unenforced Building Code*

The city of Joliet had had a more or less rigid building code for years. Without criticism of any one, let it be said that this ordinance had not been enforced with any view to fire prevention or fireproof construction. It so happened that a great deal of construction and remodeling took place in this period in the downtown district. Under the ordinance the city engineer was also ex-officio building inspector. The engineer sought the aid of the inspection bureau representative, an able man, who enthusiastically assisted, with the result that the ordinance was rigidly enforced and a much better class of improvement graced the downtown district.

### *Improving Fire-Fighting Facilities*

During the time that these several improvements in preventive measures were going forward, the administration tackled the problem of keying up those departments having the immediate task of extinguishing fires once started from accidental or non-preventable sources. As stated, both the water and fire departments were in a deplorable condition. Again efficiency and ability for service over-ruled politics and the best men in the city for chief of the fire department and head of the water department were selected for the several tasks. Negotiations were opened with the engineer of the insurance bureau and his co-operation solicited. At first this engineer was shy and suspected a trap. When he found we were not trying to unload our blame upon him, or attempting to becloud the issue in the eyes of our people by tirades against soulless corporation or shirking our own responsibility by throwing the dust of prejudice and jealousy into the air to hide our shortcoming from the people of Joliet, he met us with the heartiest spirit of co-operation. He wanted us to win a better insurance classification for our city by force of merit, and to that end prepared recommendations for improvements in our fire-fighting facilities which would, when effected, provide a lower insurance rate.

### *Common Sense in the Fire Department*

As has been said, our fire department lacked almost everything necessary to an efficient fighting organization. It consisted of five companies, located in five different houses throughout the city. It was officered by four captains at the outlying stations and a chief and assistant chief, who was practically acting captain at the central station. At the several stations in the absence of the captain no one was responsible or in authority. At a fire the several companies dissolved into a volunteer mob, with more or less individual ability or willingness for the strenuous work at hand. Drinking in the several houses was prevalent. There were bickering, factions and utter lack of pride in the organization either among the men themselves or the people at large. The new chief faced this condition and solved the problem, and out of this disorganized condition built a fine personnel, a well-disciplined organization. Booze was banished under severest penalties. A lieutenant was created at each house, so that there would always be fixed responsibility and an officer in charge. Company unity, company spirit and rivalry and company discipline were maintained at all times. Over maps of the city, showing streets, water mains and hydrants, the chief and his captains planned ahead the campaign against any fire which might start in any district. Each company had its bit to do in meeting any emergency, its particular hydrant and lead of hose to bring into a fire at any particular point. The first stream of water on a fire was a company victory. The last stream was the derision of the entire department.

### *Motor Apparatus Increases Efficiency*

With the coming of the first motor apparatus a "Flying Squadron" of eight men was organized at the central house. The rivalry became intense. Only indiviual merit coud win or hold a place upon that squadron. The slightest deficiency in ability or service placed a man back upon the slower apparatus. These, together with other means, built the personnel of the department into a finely organized, well-drilled, strictly-disciplined body of men efficiently capable of solving any emergency of fire that might arise in their city.

A careful inspection of apparatus in the department developed the fact that all was more or less out of date, as well as repair, inefficient and not well balanced. Careful tests and investigations ourselves, coupled with advice from engineers, started us on a definite policy of complete motorization of the entire department. Our own experience since has proven the wisdom of this policy. Compared with horses the advantage is overwhelmingly in favor of the motor-driven vehicle for reliability, efficiency, speed and endurance. Each new piece of apparatus was bought subject to official test by the underwriters, and again co-operation won in the splendid service these men rendered the city in the rigid tests given these machines.

### *Standardizing the Water Department*

The standardization of the water department presented an even more difficult task. The city was committed to an isolated artesian well scheme for an ultimate pure water supply, and some considerable work had been accomplished in the development of this plan, but the main supply of the city was still from a creek. Th volume varied from the floods of spring to practically nothing during the drought of summer. The quality of this creek water was consistently prohibitive in bacterial count for human consumption. The pumping machinery was capable of developing but 38 pounds hydrant pressure in the downtown section, while insufficient storage capacity made the sustained volume depend entirely on whether or not there was water in the creek.

### *Cooperation With Underwriters*

The underwriters were called in conference. The specifications of the underwriters were adapted to fit actual conditions in Joliet with its isolated well system. With plans carefully made, the new officials went to work. Artesian well after artesian well was drilled, machinery installed and placed in service until the volume of pure artesian water exceeded the domestic specifications by almost two million gallons per day. The storage capacity was multiplied by six. Water meters were installed for all consumers to prevent waste. New feeder connections for downtown were installed. New machinery was installed and old machinery repaired until the maximum downtown pressure was raised from 38 pounds to 92 pounds with adequate volume. Here again the employees were instilled with pride in their work and ability to serve. It became a crime and disgrace for a pump to be down when needed.

### *Law and Cooperation*

During the progress of this work regular meetings, attended by the heads of all the department, were held each week at the Mayor's office. At these meetings every problem of municipality service was discussed and plans for meeting every difficulty made and assigned to the proper department. Much of the efficiency maintained during the administration found its beginning at these meetings. The closest co-operation of the several departments was maintained. Any problem of fire prevention from the collection of filth and dirt was solved by the health department. Indeed, the whole action can be summarized with the statement that there is enough law already in almost any municipality to meet any emergency or condition which may arise if all of the departments of the city are co-operating and every department lends its assistance to its solution.

### *Inspection by Insurance Bureau*

We were now ready for inspection and formal request was made of the insurance bureau for a lower insurance classification. The engineer of the bureau conducted a series of exhaustive inspections and tests.

While the results were being tabulated for final decision, Joliet suffered a $100,000 fire loss. The fire was fought under the most adverse circumstances. It occurred in the middle of the night, with the thermometer more than 20 degrees below zero, and was located in the business district, immediately contiguous to other buildings containing highly inflammable material and not of fireproof construction. Yet the spirit of the men was so high that the fire was confined to the building wherein it had started and gained headway before the department was notified. For nine hours the water department maintained a minimum hydrant pressure of 72 pounds with a surplus volume, and at the close of the fire the reserve supply had not been touched.

### *18 Per Cent Reduction in Insurance Rates*

The action of the fire insurance bureau on this matter is, in my judgment, final evidence of the business relationship of the city and insurance companies. Their officials held that the magnificent work done by the firemen under such adverse conditions, the steady maintenance of volume and pressure by the water department, showed that the work of rehabilitation of the fire-fighting facilities of the city of Joliet had been accomplished, and that this fire, rather than preventing the city from gaining its lower rate, proved positively that the city was entitled to the lower rate. The city was immediately granted a lower classification, making a net saving averaging in the neighborhood of 18 per cent reduction in its insurance rates.

This completes a rather exhaustive history of the two-years' work of the city of Joliet necessary to gain a lower insurance classification. The city of Joliet received no favoritism whatever on the part of the insurance companies. Both sides treated the question as a pure business proposition of cost and service. There is nothing impossible in the whole matter, and any city in the United States which earnestly desires improvement along this line can accomplish the same.

## *Preparing Building Code for Jamestown*

PROMINENT among the activities of the Jamestown (N. Y.) Board of Commerce during the year newly ended was its participation in the drafting of a new and greatly needed building code for the city. Referring to this work, the Bulletin says:'

"Ten members of the Board of Commerce, three of the City Council and three of the Manufacturers Association are meeting weekly to compile for submission to the City Council a revised building code for Jamestown. Only the members of this committee, who have been studying what other cities are doing, can fully realize the dire need for a complete code of ordinances for regulating building in Jamestown. The safety of people in our buildings, the danger of a disastrous fire, the spoiling of residential neighborhoods by stores and factories, the maintaining of building lines, the illegal use of the city's streets, alleys and sidewalks by builders—all this is now left more or less to chance. The Committee on Building Code will present an ordinance that will make the regulation of such matters a part of the law. The tremendous value to the city of proper regulation of buildings can only be estimated. The personnel of the committee shows how the brains and experience of the whole community are brought together to work for the general welfare.

"Henri M. Hall (chairman), members of the Board of Health and a director of the Board of Commerce; W. A. Bradshaw, insurance; E. R. Bootey, attorney; L. L. Graham, civil engineer; A. E. Lindblad, architect; W. B. Pitts, electrical contractor; Victor C. Rogerson, contractor; F. M. Stearns, plumber; W. E. Stevenson, builders' supplies; Curth Swanson, contractor; John H. Tiffany, realty; Gust A. Anderson, alderman; Robert Eden, alderman; Gust Hulquist, alderman; Alfred Anderson, manufacturer; A. C. Norquist, manufacturer; C. W. Swanson, manufacturer.

## *Preventable Fires*

ACCORDING to figures compiled by the Actuarial Bureau, National Board of Fire Underwriters, over half the fires which cost New York more than $21,000,000 annually in property destroyed, are preventable. The figures show that in 1915, individual carelessness was responsible for 53.6 per cent of the fires in this State. Of the remaining 46.4 per cent, attributed to unknown causes, the board says that a large number were probably preventable.

The number of fires listed as "strictly preventable" caused a property loss of $4,358,618, or 21.7 per cent of the total. The number listed as "partly preventable" caused a property loss of $6,370,507, or 31.9 per enct of the total. Among the strictly preventable fires, the chief causes were defective chimneys and flues, matches, stoves, furnaces, boilers and their pipes, and the careless use of cigars, cigarettes and pipes. Each of these causes was responsible for the loss of more than $800,000 in property.

The figures are shown in comparison with the fire records of New Jersey and Pennsylvania for same year. New Jersey had 14 per cent strictly preventable and 23.9 per cent partly preventable fires, while Pennsylvania had 17.4 per cent strictly preventable and 35.3 per cent partly preventable fires. In every strictly preventable fire, the board says, preliminary inspection would have shown the element of langer, which then might have been easily remedied.

"Individual carelessness," it concludes, "is the greatest fire hazard."

## *"All Buildings of Wood"*

REPORTING the destruction by fire of a large section of the business district of North Rose, N. Y., on the 17th inst., press reports significantly record that "All of the destroyed buildings were of wood construction and easy prey to the flames fanned by a breeze."

Seven stores, with the major part of their stocks; the post office and its contents; three residences, and a barn were totally destroyed; aggregate loss $60,000.

## *Vetoes Cut Stone Ordinance*

When the measure requiring that all stone to be used on municipal work be cut within the city limits was presented him for signature, Mayor Mitchel, of New York City, some days ago, promptly vetoed it. Such an ordinance, the Mayor said, would violate the Inter-State Commerce Clause of the Federal constitution. Cutters in the Maine quarries, it developed, receive $3.50 a day, while the pay in New York City is $5.00.

# A General Discussion of Fire Prevention and Protection of Wharves and Piers

*Railway Fire Protection Association Report*

**The fire hazard is primarily internal**

COVERED freight and passenger piers and wharves are, as a rule, built over water on wooden pile support and usually separated by slips of good width, such slips being, in fact, necessarily ample for handling vessels of good size. The direct fire exposure externally is therefore, as a rule, moderate, except such as unavoidably arises from the presence of shipping in the slips or from burning floating material drifting under the houses. The fire hazard is primarily *internal,* arising from the large volume of combustible freight and often excessive height of sheds and large unbroken areas and from the comparative inaccessibility to fire apparatus.

**Wooden creosoted piling is practicable**

Wooden creosoted (below high water mark) piling is practicable (except in the South, where concrete may have to be used), and as a rule is under water for five-eighths of its length. Concrete piling is costly and not always practicable, and for some other reasons hardly to be urged except as a last resort where because of the ravages of teredo or similar causes wooden piling is unsatisfactory, and at most we have to deal only with that portion of the piling above low water line, that below that line being practically indestructible by fire.

**Inverted arch construction is suggested**

Cutting off piles a few feet below low water mark, and capping them, superimposing concrete sills and stone or concrete supporting piers, or continuous foundations would appear to be the best method, the situation suggesting inverted arch construction, the sills of the structure resting upon these. Owing to some uncertainties regarding light concrete work continuously exposed to salt water (reinforced work) the use of stone in hydraulic cement would seem preferable where it can be used.

**Sub-structure should be of Fire-resistive construction**

Beyond question the entire floor and platforms should be constructed of reinforced concrete, and probably this is in the long run the most economical. From a fire hazard standpoint there are many good reasons for this, not forgetting the hazard from drifting material referred to above. In fact the entire structure, from floor inclusive to a point a safe distance below low water mark, should be of fireproof (not merely non-combustible) construction.

**Superstructure of Steel Frame or slow-burning construction**

Above the floor line the conditions are reversed to a considerable extent, since a "fireproof" structure, viz., one that will withstand combustion of all of its contents without suffering material structural injury, manifestly imposes conditions of weight, and possibly expense, that render it impracticable under many conditions. It is, however, usually practicable to frame the superstructure in units of well protected steel, but unless all of the steel work can be thoroughly covered and insulated, heavy timber framing is preferable as being more completely fire resistant. By "heavy timber" is meant 12-inch by 12-inch or 8-inch by 12-inch minimum cross section, *dressed smooth.*

### Wall Covering

**Cement and Asbestos building lumber recommended**

Wall covering should of course be completely non-combustible, but nevertheless of a material which under continued high temperatures sufficient to bring about a more or less general collapse of the framing, will become friable enough to break up, which bars sheet metal, plain or corrugated. Some form of cement and asbestos (typified by "transite board") is by far the best and being non-corrosive and requiring no paint economical in the end.

### Various Types of Roofing

**Roof should be non-combustible**

Roof should be wholly non-combustible on thoroughly protected steel or carried on "heavy timber" (barring light purlins) or of 2-inch or 3-inch matched or splined plank on heavy timbering (mill construction) the latter being preferable as the better fire resisting method. The very worst possible construction is of sheet metal on unprotected steel frame, such framing buckles and collapses under comparatively moderate heat in a startlingly brief period (in some instances ten minutes or less), permitting the sheathing to fall and cover the burning contents in such a manner as to permit of intense combustion beneath it and materially interfere with, if not entirely prevent, the effective application of water. Even the very flimsiest of wooden construction is likely to give better result. These principles of construction, i. e., strictly fireproof floors, heavy framing and non-combustible siding, are applicable to pier structures of all heights.

Where roof monitors in one-story buildings are used fire resisting construction is of course desirable (the weight of "fireproof" being here ordinarily prohibitive). The ends of the monitors should be solid (no windows), sash and frames metal, *but for the side windows glazing of the thinnest obtainable glass with wire screens on outside,* unless in the very unlikely event of a heavy and intimate exposure, in which case wired glass might be necessary. The monitor is essentially a *ventilator,* and its first importance is in affording an outlet for smoke (it is smoke rather than fire that hampers firemen). So far from being an objection, especially in a one-story structure, such a vent is advantageous; such draft as is created tending to draw the fire to a single central point rather than diffuse it, while the smoke vent is extremely valuable. It will be noted, however, that this has *no* application to openings through *floors,* but entirely to monitors in roofs. Such monitors should never extend over or across fire walls, and are better discontinued at 10 feet or more from such walls.

**Roof monitors must be carefully constructed**

### *Fire Walls and Doors*

Single areas would be better restricted to a maximum of 10,000 square feet, preferably less, and height to be restricted to the least possible. Where subdividing walls *are of necessity* of wood, solid splined plank should be used, never less than 3 inches thick and preferably 4 inches, using hard wood splines as far as possible. Such walls (more properly "retardant partitions") should be sheathed with *lock-jointed* metal laid as flat as possible and with all *nail heads* covered and protected. "Lap-jointed" metal and exposed nail heads are nowhere admissible, and, taken as a whole, are apt to increase rather than diminish hazard. Flashing at roof line should be broad and heavy. On such partitions standard three-ply fire doors on one side suffice, being equally resistant with the partition. Free use of cold water "fire retarding" paint is to be urged on all woodwork. Brick or concrete parapet fire walls are of course to be desired in all cases, with double standard fire doors on all openings.

**Fire areas to be restricted to 10,000 sq. ft. or less**

### *Care in Selecting Fire Doors*

*All* fire doors should be National Standard *labeled* doors and such, as well as labeled hardware, should be clearly and distinctly specified in all contracts. The practice of calling for "fire doors" and permitting contractors to put in any sort of a contraption they choose to so designate is to be very strongly condemned. Where bulkhead, shed or offices connect piers the connecting structure should be separated from the piers by means of a fire wall at each end. The need of subdividing the space under the apex of wooden awnings protecting platforms is urged—at least opposite each fire wall or partition.

**All fire doors should be of the standard type**

Such divisions should be of metal or plank 2 inches or more, and extend solidly downward to the level of the lowest point of anwning and entirely across. There is no easier path for a fire to go *around* a fire wall than via this apex, which in its nature concentrates the draft. If awning is flat or nearly so a drop of 2 feet or more should be carried entirely across from wall to outer edge of awning at each fire division. In considerable areas, especially if height of roof or ceiling is greater than average, similar drops are very useful in trapping hot air to hasten sprinkler operation and preventing formation of air currents and whirlpools in the air. The larger the area the greater the need.

**Drops to protect apex opening**

Where tracks are run down the center of piers, necessitating large openings in the fire walls, these openings should be protected by standard fire doors with folding automatic drops to fill track pits, and care should be exercised not to allow cars to stand in the opening. These folding drops act as soon as door is completely closed.

**Track openings in fire walls should be carefully protected**

Elevator and conveyor openings should be enclosed in shafts of fireproof or fire resisting materials. All openings in such shafts should be protected by standard automatic fire doors, and top of shaft preferably a skylight of *thin* glass screened with wire above and below, at least 4 inches space from glass to screens. Such screens are best made of 14-16 gauge wire with ½-inch mesh and on metal frames.

**Protecting vertical openings is very important**

A rather *better method in buildings of moderate height,* where elevators of ordinary dimensions (not over 8-foot by 8-foot section) are used, is the metal-clad automatic hatch, which as a rule constitutes nearly absolute cut-off for drafts. In *large* elevators this is less efficient, requiring some power to operate, and a shaft becomes necessary. Cars should not be left in or near piers any longer than is absolutely necessary for the loading or unloading of merchandise or passengers.

**A better method in buildings of moderate height**

### *Offices and Trade Rooms*

Agents' and general offices should be located on the bulkhead, separated from the pier proper by fire wall, and an adequate number of fireproof exits from offices provided. Record rooms should be of approved Underwriters vault construction, with automatic sprinkler heads properly placed and at least two hand extinguishers outside the entrance door. Record

**To be cut off by fire walls and sprinklers installed**

rooms should be lighted electrically with control switch outside near entrance. Where there are auction rooms proper number of exits should be provided the same as in offices.

Offices and auction rooms should be steam heated and steam pipes properly installed with clearance at openings and between pipes and woodwork where they run parallel to same. It is generally best to install steam pipes passing through floors in water-tight metal bushings extending *entirely through floor,* and of a diameter of 1 inch greater than outside diameter of pipe. If floor is water-tight bushing should be carried 2½ inches or more above floor, otherwise cut-off flush and ordinary floor rings used.

**Steam heating systems to be properly installed**

### *Steam and Hot Air Installations*

Contact of steam pipes passing through hollow floors and concealed spaces with combustible material therein left by workmen or *brought in by rats and mice* is a prolific source of accident. Where hot-air system is used in fruit sections of piers, the steam coils and circulating fans should be located on fireproof platforms and special attention paid to small supply of oil and waste about them. Where hot air ducts pass through fire walls they should be equipped with automatic dampers.

**Rats and mice bring in conbustible material**

### *Oil and Lamp Rooms*

Lamp room should be of fireproof construction and where possible should be placed outside the pier shed. Lanterns should be stored and fonts filled in the lamp room only and this should be done in daylight. Care should be taken to provide ample ventilation to the open air at *floor line,* and some overhead ventilation. Thresholds of all doors opening into sheds or piers should be raised *three inches above floor* to prevent overfloow of vapor or burning oil. (The vapors of all hydro-carbon oils are much heavier than air.) Since such vents, in case of fire, may also act as scuppers they should be arranged with that contingency in view, in such a manner that any discharge of burning oil through them will not be dangerous. Lighting of such rooms should be arranged to comply with special requirements of National Electric Code. All small supplies of oil, gasoline, lampblack and waste should be kept in the lamp room in approved receptacles. Carpenter shops, pipe cutting shops and the like should be isolated in a similar manner to oil rooms, with drain pipes to carry away any water thrown by sprinklers.

**Lamp room to be properly constructed and used**

### *Boiler Room*

Boiler room should be of fireproof construction with stack properly protected and carried a safe distance above roof and should, where possible, be isolated from the pier shed. The use of portable boilers in or about piers is to be condemned; electric apparatus should be substituted. Ashes from boilers should be thoroughly wet down and placed in a bin of fireproof construction pending frequent removal from the premises.

**Simple safeguards against boiler-room hazards**

### *Automatic Windows of Metal and Wire Glass*

Windows in offices on pier side of bulkhead and windows facing any other exposures should be of glass and metal frames automatically controlled.

### *Lighting and Maintenance*

All buildings should be lighted by electricity installed in accordance with the rules of the National Electrical Code, and where there is a private electric plant, same should be located in the boiler room enclosure. Buildings or sheds should be kept in good repair, and decayed woodwork, especially around piles, boat racks and string pieces, should be replaced with new material. "Good Housekeeping" should be made a special feature. Smoking should be prohibited on piers and in offices connected with them and signs should be posted to that effect in English and foreign languages when foreigners are employed. Fire protection rules in English and foreign languages should also be conspicuously posted.

**National Electrical code should be followed**

### *Standpipes and Extinguishers*

Piers should be equipped with standpipes located about 100 feet apart, each equipped with 50 feet of fire hose, and monitor or revolving nozzles, automatic sprinkler system, portable chemical engines, hand extinguishers and galvanized metal casks and pails staggered throughout. Monitor nozzles being capable of instant and complete operation by *one person* are especially desirable where conditions are suited for their installation. Such nozzles have a wide range, both vertical and horizontal. Care should be taken to see that chemical engine enclosures are properly heated and that hand extinguishers are removed to heated rooms during the winter months in order to prevent freezing of the solution. Galvanized metal casks should be filled with non-freezing solution and each cask should be equipped with at least two and preferably three pails.

**Automatic, hand and local fire extinguishing equipment**

At each point of hose connection on standpipes double hose connection should be provided—one outlet for inside "first aid" hose, the other for the use of fire department. The "first aid" or private hose *except under special conditions* should be 1½ inches unlined linen hose and nozzle with ½-inch tips. Under each at a point between valve gate and

**Double hose connections should be provided**

hose thread should be a 3/32-inch perforation to care for any seepage from valve and give notice of same by dripping and to ventilate connected end of the hose. This applies equally to all diameters of hose where kept connected.

The other outlet should be 2½ inches capped and kept for use of fire department (departments prefer to attach and use their own hose and play pipes). This need not be perforated. Diameters of standpipe would better exceed that of largest outlet. Piers should have steamer connections at land end of pier, and hydrants at extreme water end. Where water lines pass through fire walls they should be equipped with valves on supply side of wall in order to shut off bleed on either side in event of fire causing line to fail.

**Steamer connections and hydrants to be installed**

Where automobiles are allowed to enter piers for delivery or picking up of freight or for shipment and where electric trucks are used, a sufficient number of sand casks equipped with scoops should be installed, and automobiles should not be allowed to stand in or on piers longer than necessary to load or unload passengers or freight with reasonable promptness, and should never be permitted to fill or drain gasoline tanks in or on piers, but always a safe distance away. All pier sheds should be equipped with a sufficient number of stationary ladders, extending from string piece to roof in order to allow free access to and from roof in event of fire, and having available a few small boats from which lines of hose can be directed from the water side is suggested.

**Automobile hazard**
**——**
**Roof ladders**

### *Fire Brigades and Alarms*

It is recommended that fire brigades be organized and fire drills conducted at least once a week, but not at stated hours. The piers should be equipped with a system of gongs on a closed circuit, operated by small signal boxes at various locations. Thermostats, central watch stations, watchmen and watchmen's clocks are recommended to be installed where practicable and where city or town fire department is available means of summoning same quickly should be provided.

**Dependable Fire alarm equipment necessary**

### *Safeguarding Old Structures*

The construction of new piers on approved lines, of fireproof or fire retarding materials, will naturally reduce the hazard which piers of wooden construction present, but there are many old piers of timber construction that will probably be in existence for some time to come, and it will be a long look into the future before a standard fireproof construction will be generally realized, but we hope for rapid progress in that direction.

**Many old timber piers offer severe hazard**

In the meantime, it is all the more essential that the older type of structures should be provided with all means of fire prevention as indicated herein. It is not, however, needful to await the period of complete reconstruction, for if a settled policy is determined and all considerable repairs and partial reconstructions are conformed, the new work, being permanent in its nature, will reduce the cost of final reconstruction, and frequently will in time practically effect reconstruction without any material expense. The essential seems to be the adoption of a definite plan and adherence to it in all cases.

**Should be provided with all means of fire prevention**

As a general proposition the foundation principles of structural fire prevention are: Avoid rough wood and small wood, joists, bridging and the like (where bridging is needful block solidly across the space). Avoid concealed spaces. Use non-combustible material, where fireproof is not available and heavy wood where suitable (sometimes wood is the best resistant). Build ceilings and roofs in open unobstructed bays that may be swept by sprinklers or hose and thoroughly protect all vertical communication between floors, but always use the nearest fireproof or the most completely resistant material where the progress of fire is to be impeded, and the lightest (non-combustible) where ready outlet is to be provided

**Interesting basic principles of structural fire prevention**

* * *

## *Next Annual Meeting of National Fire Protection Association*

WASHINGTON, D. C., has been selected as the place of the next annual meeting of the National Fire Protection Association, and the dates will be May 8, 9, 10, 1917. Members should at once carefully note this important date and make plans to attend.

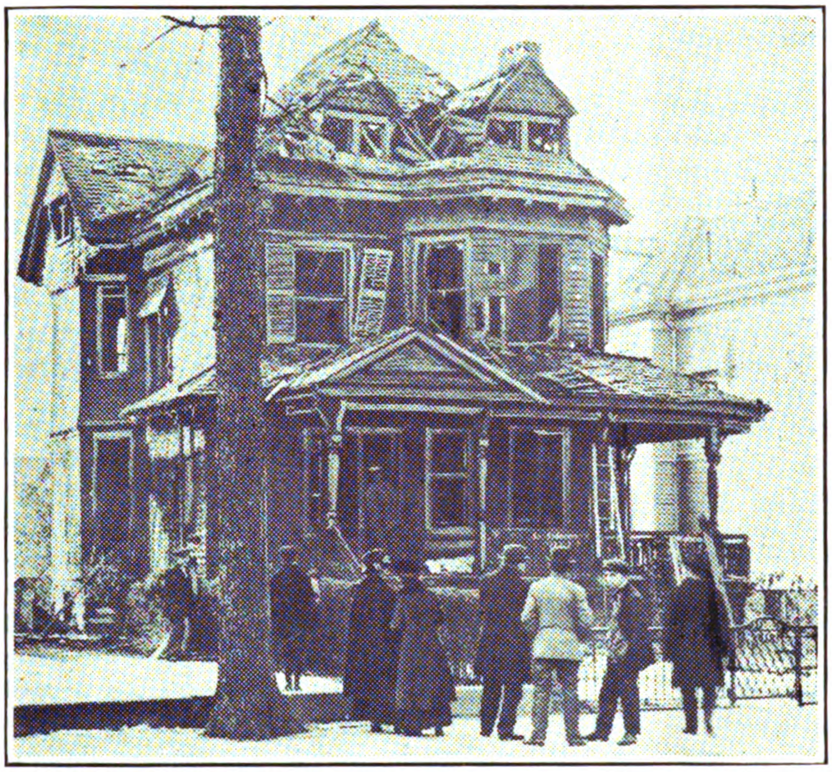
### *Important to Chairmen of Committees*

The attention of the chairmen of the various committees is called to the ruling that, except by unanimous consent of the executives, no committee report shall be acted upon by the Association in the annual meeting unless it is received by the secretary for advance publication before *April* 1 of that year.

### *Standard Hose Couplings Committees*

This committee has prepared a new book of blank forms for registering data relative to hose coupling and hydrant threads in use throughout the country. Members willing to help in the extensive plans of this important committee will please address J. H. Howland, Chairman, 76 William Street, New York City.

## Rapid Spread of Flame Causes Loss of Two Lives in Frame Dwelling



The accompanying photograph of the ruins of a frame house in which the lives of two well-known Brooklyn, N. Y., builders were lost should serve as graphic proof of the existence of the hazardous conditions resulting from all frame construction.

This fire was the result of the setting on fire of a Christmas tree by a match lit by one of the persons decorating it. The fire spread with astonishing rapidity, owing to the inflammable nature of the structural materials and the contents, and also to the layout of the house, which contained large vertical openings. The sudden blast of flame killed the owner and a friend, severely injuring the wife, daughter and servant of the owner.

When will the public learn the wisdom of safe home construction?

* * *

## Fire in Munitions Plant

FIRE followed by a series of explosions destroyed the great munition manufacturing plant of the Canadian Car & Foundry Company at Kingsland, N. J., on January 5. The aggregate property loss is placed by the company management at close to $17,000,000; $750,000 being the value of the buildings and the balance representing contents. Insurance to the extent of $3,000,000 was carried. Due mainly to the heroism of a telephone operator in sticking to her desk until all employees had been warned of the danger, no lives were lost.

A statement issued by the munition manufacturing concern regarding the disaster reads:

"In March, 1915, the Canadian Car & Foundry Company, Ltd., of Montreal, entered into contracts with the Russian Government to supply 5,000,000 rounds of 3-inch ammunition, half shrapnel and half high explosive shells.

"These contracts were partly completed by March, 1916, and on March 8, 1916, were assigned to a New York corporation, an agency of the Canadian Car & Foundry Company, Ltd., which took over the two main Russian contracts and all subsidiary contracts and supplies, and undertook to complete and deliver the full quantity of 5,000,000 rounds.

"Agency of Canadian Car & Foundry Company, Ltd., had a large plant near Kingsland, N. J., for the purpose of assembling, packing and preparing these shells for shipment. No shells were manufactured on the premises. There were employed from time to time at Kingsland from 3,000 to 4,000 men. Large quantities of these shells have been shipped to Russia.

"The two contracts were practically completed, a large quantity of shells had been delivered in storage at Kingsland to the representatives of the Russian Government, and the balance of the shells were being assembled and packed yesterday when a fire took place in one of the large buildings used for cleaning shells.

"The buildings destroyed were valued at about $750,000. The value of the contents of the buildings destroyed amounted approximately to $16,000,000. The company was protected to the amount of about $3,000,000 in insurance on the buildings and contents; the rest is a total loss. So far as we have been able to ascertain no one was killed or seriously injured as a result of the fire and subsequent explosions which took place."

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### $400,000 for Fire Engines

IN line with the policy of motorizing the Fire Department, the Board of Estimate yesterday voted an appropriation of $400,000 for the purchase of fifty automobile fire engines. The application for the apparatus was made by Robert Adamson, Fire Commissioner. It is said the purchase will result in a big saving to the city in the cost of upkeep of the department.

***A Department Devoted to the Use of***

# AUTOMATIC SPRINKLERS

***Edited by***

**IRA G. HOAGLAND, Secretary** **PAUL MASON, Special Representative**

***National Automatic Sprinkler Association***

## *Consistent Control of Conflagration Conditions*

"A CONFLAGRATION never started in a building equipped with automatic sprinklers," declared an insurance engineer before the Public Utilities Commission of Maine at a hearing in Portland on the question of an annual charge for connections to sprinkler systems from public water mains, which the property owners considered unfair, in view of the general benefits accruing to the community from general sprinkler protection. Much of what the engineer said follows:

"The congested district of every city, without exception, is liable, should the right combination of circumstances obtain, to be wiped out by a conflagration and its consequent hardships suffered: loss of life and many people made homeless. This is a danger that is confronting every city to-day. I think that we are all alert to the fact that insurance paid for loss by fire may partially reimburse the loser, but it does not replace. The material loss is not recoverable. It is an absolute drain upon the created resources of our country.

"It may be only a few years before several conflagrations may occur within a short period of time—possibilities are rapidly developing—that will so deplete the resources of our insurance companies that they will be unable to meet their obligations. The effect this will have upon our industries, our financial institutions and our property owners can well be imagined.

### *Public Knows Little About Sprinklers*

The most effective agent at present available for the automatic control of fire is the sprinkler, which actual experience proves. It is surprising how little the public knows of the automatic sprinkler, its operation and effect. Of 17,500 fires occurring in sprinklered buildings and operating sprinklers, 65 per cent were extinguished by sprinklers, 31 per cent were held in check, and 4½ per cent were not satisfactorily controlled.

"The question has been asked here in Portland, "How about sprinkler failures?" *There have not been any failures.* There have been some fires not satisfactorily controlled by sprinklers, but a study of the conditions obtaining in these instances reveals that the so-called "failures," for the most part, were because systems were crippled or not in proper condition.

### *A Record of Twenty Years*

"The records of the National Fire Protection Association include 20,000 fires in buildings equipped with sprinklers, and 12,000 fires in buildings not so equipped. This covers a period of nearly twenty years. Of the fires in the buildings equipped with sprinklers, 4½ per cent are listed as not controlled by sprinklers. Of this proportion 26 per cent of the fires were not controlled because water supplies were shut off; 23 per cent because portions of buildings in which fire started were not equipped with sprinklers, also because of defective sprinklers and defective equipment; 10 per cent because of defective water supplies. In 35 fires, or 4 per cent, explosions crippled systems; exposures and conflagrations account for 62 fires, 8 per cent of the uncontrolled fires. In all cases, except those due to explosions and exposure fires, proper installation and maintenance of equipments would have prevented these uncontrolled fires.

"But only in a few cases have serious fires followed the explosions, and in these cases the sprinkler systems and buildings were partially destroyed by the explosion. In the majority of cases the fire damage was not considerable.

"Buildings destroyed by severe exposure fires have effectively checked the fires and helped the fire departments to make effective their action. These cases are very few; no one can tell the number of conflagrations "nipped in the bud" by automatic sprinklers when fires have started within buildings."

According to this engineer's statement, the efficiency of automatic sprinklers would be 99½ per cent fine, if systems are installed and maintained properly.

"Mention has been made of a conflagration in Jacksonville, Fla., getting beyond control of the fire department owing to the floors of a large building collapsing and breaking off the sprinkler pipes, paralyzing the whole water works system at a critical moment. I have studied the report of this conflagration in Jacksonville in 1901, and can find no reference to a building equipped with sprinklers. The fire started in some fiber in a fiber factory and spread over 130 blocks in a dwelling-house section, destroying 1,700 homes, leaving 10,000 persons homeless.

### *Sprinklers as Conflagration Barriers*

"The question has been asked, 'Has any fire starting in a building, equipped with automatic sprinklers resulted in a conflagration?' A careful study of over sixty conflagrations, as well as of many block fires in which there were sprinklered buildings, reveals that a conflagration never started in a building equipped with automatic sprinklers. But on the other hand, buildings equipped with sprinkers in conflagrations have proven in many cases—twice in Boston, also in the Toronto, Baltimore, Paris and Texas conflagrations, etc.—to be barriers checking the spread of fire, thereby helping fire departments to concentrate their efforts elsewhere and get the conflagration under control. The Atlanta conflagration, and those of Baltimore, Boston, Durham, N. C.; Salem, and Toronto all started in large unsprinklered buildings and were practically at once beyond control of the fire departments.

"It has been remarked before this Commission that a certain insurance engineer has said that in many cities there are too few sprinklered buildings to check a conflagation and just about enough to threaten complete crippling of the waterworks. This assertion is borne out by the facts. Low water pressures have existed at all conflagrations, even with good waterworks, and quite irrespective of the effect of broken sprinkler connections, notwithstanding what has been said about the effect of them in the Salem conflagration.

"Conflagrations have brought out the following facts: The sprinklered building is a very valuable adjunct in time of conflagration, for although the building may be wholly or partially destroyed, before it is, it has a checking effect on the fire of much value.

"Who knows better than our firemen the conditions which surround fire aid its extinguishment? At the 1915 convention the International Association of Fire Engineers unanimously adopted a resolution to the effect that the association consider the automatic sprinkler an important means of controlling conflagration dangers in our cities.

"Water from hose streams has never yet stopped nor extinguished a conflagration; that has been done by lack of fuel. Fire departments have checked spread by flank fighting, never in the path of the wind. Unfavorable conditions generally obtain at the time of a conflagration, such as high winds, breaking of street mains, fire departments undermanned, hose couplings of adjacent cities not threaded alike, hydrants defective, etc. Fire-resistive buildings without window protection and some means of extinguishing fires starting in their combustible contents are not conflagration stops.

"The automatic sprinkler system is always on the job. A fire occurs, a sprinkler automatically opens, perhaps several, delivering water, a considerable quantity of it, right at the fire. It is not affected by delays of tardy fire alarms, slippery streets, judgment of the firemen, is not hampered by smoke, but goes right on discharging water. Its record shows its efficiency.

### *Efficiency of Sprinklers in Oil Fires*

"In 1913 I made a study of fires in all classes of factories and mercantile risks, sprinklered and unsprinklered, where fires had been caused or spread by volatile liquids, mainly naptha and benzine, alcohol, kerosene and fuel oil; conditions under which one would question or doubt the efficiency of automatic sprinklers. In all, 1,000 fires were tabulated, 474 with opened sprinklers.

"Three hundred and nine fires, 65 per cent, were extinguished by sprinklers; 153, 32 per cent, were held in check; twelve, 2 per cent, were not controlled, and only two because of the severe hazard. In 175 fires, 37 per cent, no claims were made for insurance. Two hundred and twenty-four fires, 24 per cent, resulted in but small losses, and seventy-five, 16 per cent, in large losses.

"In unsprinklered factories the results were different: No claim fires, 6 per cent; small loss fires, 30 per cent; large loss fires, 64 per cent; in sprinklered buildings large loss fires were only 16 per cent of the total, against 64 per cent in unsprinklered buildings.

"As the automatic sprinkler is a conserver of life and property, its installation should not be restricted or penalized in any way. The losses and insurance paid in seven large conflagrations show that 25 per cent of the losses were not covered by the insurance paid. Who pays for this?"

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### *A Typical Case of Sprinkler Efficiency*

Typical of the effectiveness of automatic sprinklers in controlling fires is the case reported by a fire insurance company of a fire in a fireproof building in Philadelphia containing enormous values in silks and laces. A part of the company's report follows:

"The fire originated at the base of a pile of cardboard boxes piled against wooden partitions surrounding the stock room. The fire department found the fire practically extinguished. No water from the sprinklers leaked through the concrete floors; scuppers carried it off. Loss in the building from $10 to $50—cleaning, painting and repairing; door broken open by the firemen."

THE SECOND NATIONAL COMPLETE BUILDING
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## *A Department Devoted to the Use of*
## PORTLAND CEMENT
## *in Consistent Firesafe Construction*

***Special Inquiries regarding the use of cement will be fully answered and any desired information may be obtained by addressing the office of CONSTRUCTION or the Portland Cement Association***

# *The Question of Safe Garage Construction*

WITH something like 2,500,000 automobiles in the country, it is safe to say that this vehicle has become rather commonplace. Yet, manufacturers who can gage the possible demand for motor cars within the next few years are fairly in accord in the opinion that it will not be more than five years before there will be 6,000,000 motor cars used in this country.

That "familiarity breeds contempt" is well illustrated by the indifference so generally displayed to the fire hazard which these 2,500,000 cars impose upon not only their owners but on the neighbors of owners. Only the simplest of calculation is necessary to prove how this hazard will be enormously multiplied within the next five years.

What has been done, what is being done, to offset the hazard as it exists to-day and to anticipate the hazard that will be here in a few years? It is true that various cities have ordinances which aim to reduce the fire risk of housing an automobile on one's premises. It would seem, however, from a casual inspection of the many ramshackle shanties that line the alleys in many of our cities that such measures as have been taken must have been framed as a joke, or, if not, that they are poorly enforced.

### *Insuring Absolutely Firesafe Construction*

There are enough construction materials at present available to insure absolutely firesafe construction so that there is no excuse for buildings to burn. Yet to one garage, whether private or public, that has been built with fire-safeness as the fundamental thought there are, no one knows how many—scores, perhaps hundreds—of such structures, that are fire traps.

In its essentials the garage problem is the same, whether it be a problem of housing the private car at the rear of one's residence lot or housing many cars, both pleasure and commercial, in the public garage. There is one difference, however, in that the commercial garage is usually located at some quite convenient business center where business or industry is represented by thousands of dollars of invested capital.

Concrete, brick, tile and stucco on metal frame can all be adapted to private or commercial garage construction, so that the resulting building will be as firesafe and as fireproof as human skill and modern building materials and methods can make it. Yet we find garages of all kinds, many of which have been adapted to their present use by makeshift alterations of a structure that has outlived its original usefulness. Or, if this is not true, then we find floors and walls built of essentially firesafe or fireproof material, while window and door openings are unprotected and the building is capped with a roof that contains enough combustible material to stock a fair-sized lumber yard.

### *A Garage of Unburnable Material*

It is possible to build the garage so that there is not a stick or piece of combustible material in its makeup. Floors and walls can best be made of concrete. Roofs can be designed for the same material or for protected metal frame that shall in turn carry tile or other non-combustible roofing material.

The hazard of the gasoline-operated motor car is first in the fuel necessary for its operation. Other hazards involve the human element—the care or lack of it displayed in working around the car, the possibility that open flame will some time be carelessly exposed to the high inflammable vapor of this fuel, or that improperly installed electric circuits will work their havoc. Aside from the loss which results from destruction of the car or cars stored in the garage, there is always the danger of conflagration that may involve nearby structures.

The principles of safety in garage construction are so well known that it is almost needless to touch upon them. First comes a fireproof building; second, constant and effective ventilation, so that fuel vapors will not be confined or cannot accumulate in sufficient quantity to be dangerous; third, that the fuel and oils necessary for car maintenance shall be properly cared for, that rigid rules be made and enforced under heavy penalty as regards working about the car, replenishing fuel supply and leaving oil-soaked waste about to invite spontaneous combustion.

Cars are valuable enough to be protected both from within and from without. No structure is fireproof or firesafe in the modern acceptation of the word unless the roof is completely non-combustible and all openings, such as windows and doors, are metal clad and glazed with wireglass in metal sash and frames.

If necessary to heat a garage, the plant for this purpose must be entirely outside of the structure. Steam heat or hot-water systems only are permissible. The ignition system of a car is an element of risk, although it becomes such only when a stray spark at the timer may serve to ignite inflammable vapors which may have collected under an improperly or poorly ventilated hood. But the makers of cars have thought out pretty well these details and have made cars as nearly foolproof in this way as possible. Yet it is conceivable that the garage may become so filled with inflammable vapor that explosion and fire may follow from operating the engine before having opened up windows and doors and blow this vapor out.

### *Incombustible Interior Equipment*

One should not stop after having built the structure itself firesafe throughout. There are interior appointments to be considered which vary as the needs or taste of the owner or user may dictate. Locker room and work shop or repair facilities are desirable appointments even in the small garage. They are necessary in the commercial one. There is no excuse for having wood benches or wood lockers, since these also can be made of non-combustible material. A concrete work bench can be built of units and readily erected. Lockers of sheet steel are a stock in trade of several firms specializing in such fittings.

A gasoline storage tank of steel encased in 6 inches of concrete and equipped with a gasoline pump should be placed outside of the garage underground and at least 10 feet distant from the structure. The top of this tank may be 2 feet below ground level. Pipe and pump connections should be a part of the tank equipment and should lead into the garage, although the inlet for filling the tank should, of course, be out of doors. Only electric lights should be used and the wiring should conform to the requirements of the National Board of Fire Underwriters, so that danger of fire from improper electric circuits will be eliminated.

In the commercial garage it is very necessary that the workshop be completely walled off from the car livery quarters, and that entrance to this room or shop be from the outside. Forges are often necessary in repair work. They are open fires. Also grinding wheels give forth sparks from working tool steel and are a menace. It goes without saying that smoking should be prohibited in any garage.

In some cases sewer connection with garage drains is prohibited. Gasoline vapor when mixed with air is heavier than air and will seek a low level almost as readily as water. All connections between drains and sewers should therefore be vented and be equipped with intercepting grease, oil and inflammable liquid traps or separators which will completely separate such substances from water and sewage and permit of their safe and convenient removal.

### *Is the Concrete Floor Satisfactory?*

It has been said that the concrete floor is best for the garage. This may be questioned by some whose experience with concrete floors has been unsatisfactory, but such dissatisfaction can always be traced to faulty workmanship or materials and methods of construction. Many persons imagine that when concrete floors fail to give good service in a garage or under similar conditions, that the oils and greases dropping from the cars are responsible for the seeming disintegration of the concrete. This is not true. Concrete is used by many refineries and oil works in the construction of storage tanks, and it has been proved that dense concrete properly placed and finished is proof against any injury from mineral oils. Only one objection can be raised against such floors, which is that in course of time they become discolored from the oil drippings; but even this ethical objection can be done away with by applying to the floor, after it has thoroughly hardened and before the structure is put into use, some one of the oilproof or acidproof paints that are now on the market. Good construction methods, however, make it unnecessary to resort to paints, "dopes," or other treatments.

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## *Building Regulations for New York State*

WITHIN a brief time there will be introduced into the New York Legislature a bill planned to regulate building construction throughout the State. The measure, which is to amend the general cities law, has been carefully drawn and approved by the mayors' conference. The provisions of the bill follow:

To regulate and limit height and bulk of buildings hereafter erected and to regulate and determine the area of yards, courts and other open space and to divide the city into districts for such purposes. Such regulations shall be uniform for each class of buildings throughout any district, but the regulations in one or more districts may differ from those in other districts. Such regulations shall be designed to secure safety from fire and other dangers and to promote the public health and welfare, including, so far as conditions permit, provisions for adequate light, air and convenient access, and shall be made with reasonable regard to the character of buildings erected in each district, the value of the land and the use to which it may be put, to the end that such regulations may prove of benefit to the general public and conserve and enhance the value of land throughout the city.

**Edited by**
**SAMUEL GEORGE WEBB**
**Secretary**
**Gypsum Industries Association**

**A Department Devoted to the Use of**

# GYPSUM

**In Consistent Firesafe Construction**

***Special inquries regarding the use of Gypsum will be fully answered and any desired information may be obtained by addressing the Office of Construction***

# The Effect of Water Uoon Gypsum Masses

IN the December number we touched briefly on the subject of non-conductivity of heat of gypsum. This has a direct bearing upon and relationship to the low expansibility of gypsum materials under heat. It is manifest that to bring the effect of heat to bear upon the whole body of gypsum it is necessary that this whole body shall be heated, and it is only under such conditions that the expansion, due to heat, becomes effective.

The fact, therefore, that gypsum is a slow conductor of heat, and that heat applied to an exposed surface travels into the mass of gypsum with extreme slowness, is therefore important and renders it very difficult indeed for the co-efficient of expansion to become effective throughout the entire mass.

### Low Co-Efficient of Expansion

The co-efficient of expansion of gypsum is low, being about one-half that of steel, and therefore if the entire mass was heated its expansion would be about one-half the expansion that would occur in a similar mass of steel. Using this illustration to make the point clear, the conductivity of heat of steel is high, and therefore the entire mass readily becomes heated and the coefficient of expansion becomes operative through its entire mass, whereas a similar mass of gypsum would be only locally heated, and therefore the coefficient of expansion would not become operative in the greater proportion of the mass.

We have therefore seen that gypsum materials, when exposed to heat, do not expand because the heat is not conducted into the mass.

Many hard materials that have high conductivity of heat, even with no greater coefficient of expansion than gypsum, become expanded, and in such cases as partitions or the covering of steel columns actually may become self-destructive through this cause.

If gypsum were expanded when similarly used its comparatively soft structure becomes a very desirable factor, as—in the case of use for covering stell columns—if expansion did occur it would not exert a crushing effect on itself, but such expansion would be taken up by the material imbedding itself in the angles or gussets or rigid surfaces at the top or bottom of the steel column.

### The Effect of Water

We now come to the question of the effect of water upon gypsum masses, which is an important question, especially where the material is used in structural units and used in the construction of partitions, etc.

A great number of tests have been conducted to ascertain the crushing values of gypsum blocks, both when dry and when saturated with water and also when dried again after saturation with water.

Such tests conducted on most of the standard makes of gypsum blocks by the Underwriters' Laboratories in Chicago have shown that the crushing value of gypsum block when saturated is just 50 per cent of its value when dry and before saturation. When such blocks have been saturated with water and then dried again at low temperatures it has been found that the blocks resumed their original strength—indeed, strange as it may seem, there is an actual increment of strength, due doubtless to some unhydrated particles being completely hydrated during such saturation.

The question of loss of strength in gypsum bodies, when saturated with water, thus becomes an academic one, for the reason that the factor of safety in crushing values for gypsum blocks when used for non-bearing partitions is so great that a loss of one-half of such strength would still leave an enormous margin of safety.

The effect of water upon gypsum that has been exposed to fire is the next subject to consider.

Under the exposures to the different intensities of heat for different lengths of time, as conducted in the series of tests by the Underwriters' Laboratories in 1911, varying thicknesses from the heated surfaces of the tested gypsum blocks were calcined. This calcination liberated the water of hydration, and this liberation of combined water effected a shrinkage of the gypsum mass, so that characteristic shrinkage cracks appeared on the surfaces of the blocks after being exposed to fire.

This calcined gypsum is in a friable condition, and when exposed to a stream of water is with comparative ease washed away. In this manner the calcined gypsum from a block or panel that has been tested under fire is washed away back to the point in the structure where the calcination has ceased.

The net effect, therefore, of water in the form of a high-pressure water stream on gypsum construction which has been exposed to fire is to wash away the material that has been calcined, leaving the uncalcined material practically unaffected,

The specifications of the National Board of Fire Underwriters for a "fireproof" partition are that the built-up panel shall be exposed to fire for two hours, the temperature being raised to 1,700 deg. F. during the first half hour and maintained at 1,700 deg. F. for the remainder of the test. Immediately at the conclusion of the fire exposure the panel is exposed to a stream of water issuing from a ⅞-inch diameter nozzle at 60 pounds pressure at the nozzle and applied for five minutes, the nozzle being held 20 feet from the panel.

Under these specifications a number of manufacturers of gypsum blocks have submitted their blocks in the built-up form as partitions for test and approval, with the result in all cases that the partitions stood both the fire exposure and the water application. The specifications of these tests require that at the conclusion of both fire and water application the structure shall have sufficient stability to stand alone, and that no flame or smoke shall have passed through the partition.

### *Gypsum Block Partitions Pass Severe Test*

In all of the cases referred to the gypsum block partitions have satisfactorily passed this very severe test. In all cases, also, the result showed that approximately about one-half of the thickness of the 3-inch hollow gypsum blocks used were calcined, including the one-half inch of gypsum plastering on the heated face. This calcined material on the application of the fire stream, as above described, has been washed away, leaving in the case of 3-inch partitions, 1½ inches of the blocks and ½ inch of the gypsum plaster on the rear surface, or 2 inches in all wholly unaffected.

In such tests the physical characteristics that we have referred to in this and previous articles are brought into play and the results coincide absolutely with what is to be expected from the possession by gypsum of such physical characteristics.

In all such tests the passage of heat through the partition to the rear side is negligible, as the temperature invariably is not raised materially above the outside temperature of the air. This proves the non-conductivity of heat.

In such tests, furthermore, there are found no stresses, due to expansibility under the heat application. In this connection it may be pointed out that the effect of heat is actually a reduction of volume, due to the liberation of the water of hydration and the temperature of the uncalcined material behind the calcined material is not raised at any time above the temperature required for the liberation of the water of hydration, which is approximately 230 deg. F. This was clearly shown in the charts accompanying the article in the December issue of CONSTRVCTION in this section.

### *Water Tests Over-Emphasized*

It is a serious question whether the subject of water application in fire tests is not over-emphasized, for the reason that in actual application it is very rare indeed that any long-sustained application of water at high pressure would be met with, because of the conditions in fires and the difficulty of getting close access to the seat of the fire by the firemen with the hose streams.

There have been numbers of fires which gypsum block partition constructions have passed through which illustrate this point fully. One or two instances will probably suffice to support this statement.

In March, 1912, a fire occurred in the Statler Hotel, Cleveland, Ohio, during the construction of the building. The fire was produced by the burning of a supply of gasoline in a room which was used for the storage of gasoline and gasoline torches. The walls were of gypsum blocks and the floor slabs of flat arch terra cotta tile. None of the surfaces had been plastered. After the fire the writer examined the condition of the gypsum partitions and found that he could not remove over one-eighth to one-fourth of an inch from the surface of soft material with his thumb nail.

Some years previously a fire occurred in the stairwell of the library building of the University of Pennsylvania, Philadelphia. The stair was completely gutted, but the gypsum walls enclosing the stairwell remained virtually unaffected, and a library of books in contact with the inner surface of some of these gypsum walls enclosing the stairs was wholly uninjured. This case illustrates the non-conductivity of heat through the partition and also the stability of the partition under both fire and water exposure.

### *Lower Loss Record for New Orleans*

Thanks largely to the rigid risk inspection service enforced in New Orleans by the Louisiana State Fire Marshal, the fire loss record of the city for 1916 was substantially less than that of the previous years; the figures for 1916 and 1915 being, respectively, $721,772 and $742,286.

# LEGAL DEPARTMENT

**Edited by WILLIAM LAW BOWMAN, C.E., LL.B.**

## A Discussion of a Proposed Uniform Contract

*T. D. McCloskey, of Kinnear, McCloskey & Best, attorneys for the National Association of Sheet and Tin Plate Manufacturers, delivers an opinion on the proposed uniform contract now used by sheet manufacturers and likely to be adopted by others in iron and steel lines*

I DESIRE to preface what I have to say with this observation—that, when we approach the discussion of what this Association may do in combination or by co-operation, we tread a "No Man's Land," upon which the batteries of producer and consumer, seller and buyer, manufacturer and purchaser, are trained, where there is no settled peace, and about which the final arbiter, the Supreme Court, has spoken in general terms only.

The condition in which you find yourselves is a legacy from the past. It is not hard to understand how it came upon you. Practiced by a few at first, many manufacturers, feeling their helplessness, at last and compelled by insistent buyers, came to acquiesce, and granted concessions in the way of guaranteeing prices against market decline, until the practice became a custom or habit of the trade. I am inclined to believe that an alleged agrement which does not bind the purchaser to take what he professes to buy, when it suits his convenience to refuse, and yet is interpreted by the buyer to hold the seller to furnish, notwithstanding the reaction of the market, is not a contract at all and unenforceable. Yet the consumer has insisted and the manufacturer has consented to be bound.

The condition, however, has now become intolerable. The legal mind views the situation with astonishment. It is not strange that, in the words of one of your members, the Federal Trade Commission was "amazed when informed of the way in which steel has been sold under alleged contracts." On the other hand, it is natural that the buyers pressed the seller in the matter of prices when it was to their advantage to do so, or, as one of them puts it, "as long as steel companies continue to offer such one-sided agreements we can hardly be blamed for accepting."

As a result of it all, you individually find yourselves helpless, impotent, confronted by persistent, possibly unscrupulous, buyers; suspecting your competitors, you are unable, except by concerted action, to restore your business to a condition of real, open and fair competition.

For three years or more this Association, as well as others, has been seeking some way out. For the past six months your Executive Committee has concentrated much of their time and attention upon the solution of the problem. Pamphlets have been written and printed, and the widest publicity has been given to your actions, with the view of reaching a wise and safe conclusion.

The purpose of all this effort has been to produce a form of contract which might lawfully be approved by this Association and recommended for adoption by the members, chiefly eliminating the evil of guaranteeing prices against market decline. The contract is before you. Have you succeeded in your purpose? I confine myself to the paragraphs contained in the "Special Agreement." They read as follows:

"The buyer's failure to furnish specifications as herein provided shall be deemed a refusal to accept the tonnage unspecified, which thereupon shall be deducted from the contract; and the buyer shall pay to the seller, as liquidated damages and not as a penalty, the difference between the contract price of such material for which the buyer has failed to furnish specifications (less freight allowance, if any) and the market value thereof at the time of such failure; but such damages shall not be less than ten per cent (10 per cent) of said contract price.

Four things stand out at once.

First—The provisions are fair, fair to both parties. Default of either buyer or seller is provided against.

Second—Those matters in which default usually occurs are the subjects of the paragraphs; the failure to specify or receive, and the failure to ship.

Third—The language is plain, unambiguous and imperative. This should be true of every contract, especially of this, the keeping of which will remedy so gross an evil.

Fourth—If there be a default, the party who fails must pay substantial damages. The strongest persuasion I know which can be brought upon a party who desires to break a business contract, to induce him to live up to that contract, is to insist that he shall have to pay substantial damages for his breach. I suppose it is an inalienable right which we all have, except we be sailors, to break a contract and pay the damages. It is dishonorable, and that will deter most. But if such a contract as is now before you is executed, you have gone as far as you can, and among honorable men it is enough.

### What is the Morality of the New Situation as Compared with the Old?

If such a contract will accomplish what you wish—the elimination of unfair practices—what is the morality of the new situation as compared with the old?

Under the old alleged contracts there was no mutuality whatever. The seller was held to be bound, while the buyer was at liberty to refuse to specify when the market began to pinch. A contract is made to be kept by both parties, not broken; and yet, under the old conditions, the purchaser intended when he signed his name to hold the manufacturer when the situation began to hurt him, but to slip from under when the market began to decline. The honest buyer was at the mercy of the unscrupulous. Overbuying was the necessary result. The careful and honest buyer, to protect himself against the speculations of his unscrupulous neighbor, was obliged to contract for that which he knew he would not and could not take.

Some consumers bought three and four times above their actual necessities. On the other hand, the manufacturer oversold, contracted to deliver far more than his mill could furnish. The seller was helpless; the buyer could not lose.

### Misusing a Contract

In all my practice I have never drawn a contract which I knew my client did not at the time intend to keep. That would be dishonest. But here you have a situation where one of the parties, at the inception of the alleged agreement, not only intended to break it if it hurt his pocketbook, but probably use it as a club to beat the other fellow down by fraudulently representing a lower offer from a competing manufacturer, and yet such an instrument was supposed to be a contract. The situation was utterly intolerable. There were no morals except bad morals in it. It was certainly an extraordinarily bad situation for both the manufacturer and the consumer; and the business of both was becoming demoralized. The situation had to be met in an emphatic manner. This contract was evolved.

It does no violence to either party. The buyer is free to buy from whom he pleases and the seller to sell and at whatever price. An unfair and pernicious practice is eliminated. The market is free. It is open to everybody. But the buyer must take what he agrees to purchase, and the seller must deliver. That is good sense and good morals.

### Is it Good Business

Is it good business? It would be presumptious in me to atempt to advise this body, after the experience you have had as to the business advantages of the change. I have but a word to say. According to your resolution of July 18, 1916, you are of the unanimous opinion that the practice of guaranteeing prices against market decline is "unsound," "unfair," a "wrong," an "evil." From the responses of the trade to the resolution, which was given such wide publicity, it appears that more than 75 per cent of the consumers or buyers are of the same opinion. I quote from a few replies. A buyer from York, Pa., says: "We are heartily in favor of these resolutions, provided that all the manufacturers of steel sheets adhere strictly to them." Another from New York: "It is rather to be wondered at that the manufacturers have not before this, by united action, tried to put an end to the objectionable features in contract practices." An Indianapolis buyer believes, "of course the principle is good, but the question would be whether or not it would be lived up to."

### An Unbusinesslike Practice

A Boston consumer replies with conviction that the practice "is unbusinesslike, and we believe that the means of correcting it lies entirely in the hands of the independent manufacturers." And Baltimore says: "If all the manufacturers have backbone and spunk enough to live up to these resolutions the condition throughout the country will be very much better." Illustrations might be multiplied. If the experience of both parties is so emphatically against the ancient practice it can hardly be otherwise than good business to do away with it. Not to do it is to doubt your own judgment.

### Will Your Action be Legal

Will your action be legal? I have examined all the Acts of Congress and cases bearing on the subject. The Sherman Law, Section 1, provides in part as follows: "Every contract, combination in the form of trust, or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is hereby declared illegal."

Section 2. "Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States or with foreign nations, shall be deemed guilty of a misdemeanor."

Section 3 makes such acts illegal in the territory of the United States or the District of Columbia, or between them or any State or foreign nation.

The Clayton Act provides, Section 2, in part: "It shall be unlawful for any person engaged in commerce, in the course of such commerce, either directly or indirectly, to discriminate in price between different purchasers of commodities . . . where the effect of such discrimination may be to substantially lessen competition or tend to create a monopoly in any line of commerce."

Section 3 of the same Act makes it unlawful to sell or lease goods or to fix a price, or discount, or grant a rebate on the condition that the purchaser shall not use goods of a competitor when the effect may be to substantially lessen competition or tend to create a monopoly in any line of commerce.

Section 7 prohibits the acquisition by a corporation of the stock of another corporation where the effect may be to lessen competition, restrain commerce or create a monopoly.

### *No Attempt at Price-Fixing*

There is no attempt on the part of this body to fix a price, grant discount or rebate, or discriminate in price between purchasers; nor can I see that the contemplated action in approving the contract before you has any tendency to create a monopoly. If your action is illegal, it must, therefore, infringe against the provisions of the first section of the Sherman law.

Everett N. Curtis, Esq., in his preface to his late work, "The Manual of the Sherman Law," says: "While there is a difference of opinion as to the ultimate effect or scope of the Standard Oil Company and American Tobacco Company decisions, the legal situation is certainly clarified to the extent of indicating the policy of the Supreme Court so as to interpret the Act as to repress the evil that it was designed to reach, and to apply the remedy without regard to disguise or subterfuge of form; the purpose of the Act as now announced being to reach only such restraints or monopolistic methods as are unduly or unreasonably restrictive of competitive conditions."

### *Legality of Act Judged by Effect*

As I have said to you before, the purposes of your organization are lawful, but a lawfully organized body may do that which would be unlawful. Your acts must be judged as the occasion arises. If your act in approving this contract infringes upon the statute, then *it is* wrong. It is the intent of the resolution that all your members shall adhere to it so far as practicable. The adherence is voluntary, of course, but nevertheless, passed in meeting assembled, the effect thereof will be necessarily that the freedom of members will be, in a measure, restrained. The legality of your act will be judged by its effect. Any restraint upon the members will in a measure affect trade, as does any combined action of those who are engaged in trade. But every restraint of trade, everything which interferes with the flow of commerce, is not illegal. In Anderson vs. U. S., 171 U. S. Rep., 604, it appears that traders buying cattle at the Kansas City stockyards formed an association for the better conduct of their business, and agreed that they would not transact business with any yard traders who were not members, nor buy cattle from those who also sold to yard traders who were not members, of the association. The association, like yours, was open to all traders upon the same conditions, and its members were permitted to compete among themselves and with those who were not members. It was held legal. Yet, in a measure, it must have acted, in an indirect way, as a restraint upon trade.

As I understand the law, to be illegal your action must be unduly obstructive to the movement of trade, or unduly or unreasonably restrict competition.

### *Guaranteeing Against Market Decline Wrong*

It is your unanimous opinion that the practice of guaranteeing prices against market decline is vicious and wrong. The great preponderance of the opinion of the trade is to the same effect. Probably not a pound less steel would be used under the new conditions than under the old. The market is just as open, competition among yourselves and with others is just as free. The buyer is at liberty to buy from whom he pleases, and whoever sells him can do so at whatever price he can get. The only condition is that the buyer must take what he contracts to purchase and the seller must furnish what the buyer contracts to take. I am unable to see that a resolution of your body that the contract be approved and recommended for adoption by all manufacturers unduly obstructs the movement of trade in the channels of interstate commerce or is unduly or unreasonably restrictive of competition. I am of the opinion it would be lawful.

In closing, let me draw your attention to the fact that when the present abnormal conditions are ended, there will be an avalanche of demands on the part of buyers that their orders be cancelled. The proposed contract emphatically informs them that the contract means what it says—that the material contracted for must be received. It would not be fair to allow them to contract on the old assumption that when the market breaks the buyer may rescind and at the time of the break inform them of the change in policy. They should now or at the time of contracting be informed of the change so that they cannot be in error.

### *Your Contract, then, Becomes a Source of Strength to Both Parties*

Your contract, then, becomes a source of strength to both parties. The buyer will know that he will receive his material without delay and can plan his affairs in a businesslike manner . The seller will know the materials contracted for are really sold and can arrange his requirements so that shipments will not be delayed.

In the liquidating damage clauses you have provided a means for determining the loss in case of a breach by either party, which in any action is one of the most difficult, oftentimes impossible of proof.

In view of the general belief that, during the changed conditions to come, an overwhelming demand will be made upon the manufacturer to revise his prices, it is the part of wisdom to fortify yourselves with a contract which is plain and the terms of which are imperative, under which the damages for the breach thereof can be easily estimated, and about which neither buyer nor seller can be in any doubt whatever.

## The Greatest Building Exposition in History

### To be Held at Grand Central Palace, New York City, March 5th to 11th, 1917

EARLY in March the doors of Grand Central Palace, New York City, will open to the public, placing at their service the most complete and instructive Exposition ever planned of the materials and processes which have made possible the varied structures which house the people and industries of America.

Here will be demonstrated the splendid possibilities of the basic building materials such as structural steel, cement products, brick, architectural and structural terra-cotta, limestone, marble and lumber in its various forms.

### Shows Rapid Evolution in Building

In conjunction with these will be shown special types of construction, fire-resisting metal window frames and sash equipped with wire glass, expanded metal products in the form of lath floor and partition constructions; heating, ventilating and plumbing systems, elevator installations, modern home building ideas and numerous other products and methods which have made possible the rapid evolution in building construction which tends to make the United States foremost among the nations in this activity.

Here the manufacturer, architect, contractor and prospective builder will get together to exchange ideas and become familiar with recent developments in all the industries related to building construction.

A special feature of this Exposition is a contest wherein architects are invited to submit floor plans and elevations of moderate priced homes, cash prizes being awarded for the best designs. These plans, coming from prominent architects in communities throughout the United States, will in themselves provide an interesting exhibit.

From an economic standpoint vast changes are taking place in the building and allied industries and public sentiment is turning rapidly to the better forms of construction, with the result that public interest is being more and more aroused in new building methods, products and ideas. Hence it is a safe prediction that the attendance at this Show will run well over one-quarter of a million interested persons, particularly in view of the fact that the recorded attendance at the First National Complete Building Exposition held last year in Cleveland was over 150,000.

Great industrial enterprises are now engaged throughout the country in constructing modern buildings for the housing of manufacturing activities, and are further becoming more and more interested in the project of so housing their employees that labor, the most important tool of industry, shall be rendered more efficient by environment and the establishment of a community of interest between employer and employee through the medium of better housing and working conditions.

The selection of structural materials and building methods for office building and mercantile structures of every type is being made a careful study on the part of property owners, prospective builders, architects and engineers. In the home-building field the eyes of the people are turning toward more careful selection of materials and plans which offer those esthetic qualities and modern conveniences which are becoming a recognized factor in the building of American homes.

### Investigating Structural Materials

The United States Government through the Bureau of Standards is now engaged in a careful investigation of structural materials with a view to the providing of proper information for the public in matters relating to building construction.

All these and many other activities in this field find their proper place in the coming Exposition and should make attendance essential to those who are in any manner interested in the subject of the construction of buildings of every type.

Grand Central Palace has become famous for the interesting and highly successful Expositions which have been housed within its walls, and there is every reason to believe that the coming Building Exposition will prove beneficial both to the manufacturer and to those interested persons who will attend this, the greatest Building Exposition recorded in the history of the industry.

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## Building Operations at Akron, O.

WITHIN the year ended November 1, 1916, 4,445 buildings were erected in Akron, Ohio, their total value aggregating $12,065,986. Compared with the returns of the previous year, the valuation figures show a gain of $6,713,751, or 120 per cent. Akron is a wideawake industrial center, the growing attractiveness of which has been largely brought about by its alert and well-managed Chamber of Commerce.

## *How Cotton Compresses Should Be Built*

E. D. SOMPAYRAC, a leading architect of Columbia, was selected by Insurance Commissioner McMasters, of South Carolina, to thoroughly investigate the burning of the large Columbia Cotton Compress at Columbia on December 2d last, and to make recommendations for the proper building of such structures in future.

Testimony disclosed that the fire in the Compress was discovered shortly after it started, but its spread was so rapid that the fire extinguishing apparatus was wholly ineffective. The construction of the building was such that it permitted practically an instantaneous spread of the fire. The building was erected about twenty-eight years ago, consisted of a covered platform, open on all four sides, approximately 165 feet by 275 feet, making an area of about 45,000 square feet, and containing at the time of the fire something more than 3,000 bales of cotton. Approximately the total loss is from $375,000 to $400,000, and the salvage will amount to about $75,000, leaving an approximate net loss of $300,000.

The building was constructed entirely of wood, including the floor and roof supports, the floor being about 3 feet above the ground. The floors were of 2-inch plank, single thickness except for runway to press. The roof sheathing was covered with tar and gravel roofing. The boiler house, located on the northern edge of shed, was of 13-inch brick walls, with parapet extending above its roof. The office was of frame construction, being located just north of the northern edge of shed. A small frame oil house and a corrugated iron house for loose cotton, both detached in yard nearby, constituted the buildings destroyed or damaged by fire.

Mr. Sompayrac has furnished the Insurance Commission with an estimate of the cost of building a compress in sections, each to contain 500 bales, each section in effect being a fireproof warehouse with 13-inch walls, roof and supports of reinforced concrete, earth floor and sprinklered throughout, which would approximately cost $7,250 a section, and for a compress giving storage for 3,000 bales, approximately $45,000. Such a compress relatively would get the same insurance rate as a sprinklered warehouse is on the property of the Columbia Compress. The insurance rate on this is 20 cents, as against a $2 rate on the compress proper which was burned.

The Insurance Commissioner states that the conclusions to be drawn from the report of Mr. Sompayrac are that it will result in a great public saving to require that cotton compresses hereafter constructed be in fireproof compartments of not exceeding 500 bales capacity, or possibly somewhat larger, the whole to be sprinklered; that it would be incomparably better to require that such a building costing $45,000 to be built than to permit to be used inflammable sheds containing inflammable material and exposing to the hazard of one fire $300,000 to $400,000 worth of cotton. The Insurance Commissioner states that forty-odd towns of the State have building codes which are ample to prevent the construction or the use of such inflammable sheds in the future and which if enforced will require that cotton compresses constructed hereafter be constructed of fireproof material with limited areas of floor space.

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## *Seek Repeal of Anti-Wood Shingle Ordinances*

LUMBER interests, powerfully organized and plentifully supplied with specious arguments, are making a determined effort to secure the repeal of present anti-wood shingle roofing ordinances in cities throughout the South. Successful in attaining their purpose at Birmingham, Ala., they are now working at Atlanta (the Gate City of the South) and confidently predict they will win there, too.

Under Atlanta's present ordinance a wood shingle roof damaged to the extent of 50 per cent may be repaired with material of like kind. In other cities the repair latitude allowed under like conditions does not exceed 25 per cent. But the 50 per cent allowance even does not satisfy the lumbermen, who insist that all discrimination against wood shingles be removed, and assert they will be satisfied with nothing less.

Birmingham had so disastrous a fire experience some years ago that a number of fire insurance companies refused to continue doing business in the city longer, and the merchants found great difficulty in procuring a sufficient amount of reliable indemnity. To meet the demands of the underwriters, ably supported by the local fire chief, the Birmingham Council adopted a stringent ordinance limiting the area of buildings that might be roofed with wood shingles; statistics clearly demonstrating such hazard to be one of the most severe with which the fire department had to contend. But despite its experience in this direction, and the disastrous conflagrations in the cities of Augusta, Nashville and Paris—all three due in very large measure to the incendiary wood shingle—the authorities at Birmingham yielded to the blandishments of the lumbermen and modified the erstwhile safety laws. The net result is a complete re-rating of the city by the underwriters with a view to enforcing higher premiums. Thus the gain of the lumbermen will be at the expense of the property owners generally.

Encouraged by their victory at Birmingham, the represesentatives of the lumbermen turned their attention to Atlanta, and are working in season and out to have even its half-way protective ordinance removed.

# New Literature in the Field of Building Con-

*Reviews of Books, Catalogs and Other Literature Which Should Be*

### *Structural Defects*

AN illustrated booklet containing suggestions for the elimination and protection of *structural defects,* as prepared by the Committee on Manufacturing Risks and Special Hazards, has been published by the National Fire Protection Association, and may be had at 5 cents the copy by addressing the Association at 87 Milk Street, Boston.

Hollow spaces and vertical openings in buildings already constructed may be protected in such a manner as to hamper the spread of flames and so lessen the danger of serious fire loss.

This booklet should be studied carefully, and valuable suggestions contained therein applied to reduce the severe fire hazard existing in so many buildings.

### *Public Instruction in Fire Prevention*

A SYLLABUS prepared by Franklin H. Wentworth, secretary of the National Fire Prevention Association at Boston, Mass.

The distinct value of teaching school children the rudiments of fire prevention cannot be too strongly emphasized.

The subjects outlined in this syllabus are The Extent of the Fire Waste, The Economic Significance of the Fire Waste, Fire Causes and Prevention, A List of References, Suggestions for School Essay.

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*KNICKERBOCKER KOMMENTS* is a live little house organ, which should appear monthly in the mail of all those interested in the use of Portland cement in its various forms. The paper may be had by applying to the Knickerbocker Portland Cement Company, 30 East Forty-second Street, New York City.

### *The Avoidance of Fires*

A TEXT book on the subject of the fire hazard and fire prevention, by Arland W. Weeks, Professor of Education in the North Dakota Agricultural College, and published by D. C. Heath & Co., Boston, New York and Chicago, is particularly designed for use in the schools of America.

The economic waste of fire, its various avoidable causes, and simple means of fire prevention and protection against fire loss are set forth in an attractive and understandable manner.

This book, which has the necessary qualification of sustaining the interest of pupils, is an excellent contribution to fire prevention literature and should prove of value in helping to direct public attention to the important economical question of the fire waste.

### *Interesting Special Reports*

JOHNSON & HIGGINS has sent direct to a selected list of W. F. P. A. members two special reports: Report 100, Ice Formation in Sprinkler Piping in Cold Storage and Freezer Building, and Report 125, Storage of Nitro-Cellulose Motion Picture Film. Those who are interested in obtaining copies should address the above concern at 49 Wall Street, New York City.

### *Safety First for Vocational Schools*

THE Division of Agriculture and Industrial Education of the University of the State of New York (Albany) has published a well-illustrated 90-page book, prepared by Lewis A. Wilson, Specialist in Industrial Schools, entitled "Safety First for Vocational Schools." The book demonstrates what the progressive States are doing to educate the youth in the safe handling of tools and machinery before they graduate into the mills and shops of the nation.

### *Gasoline Explosive Conditions in Sewers*

THE Bureau of Mines (United States) has brought out a pamphlet (Technical Paper 117) on the quantity of gasoline necessary to produce explosive conditions in sewers. The Superintendent of Documents, Government Printing Office, Washington, D. C., will furnish it for 5 cents a copy.

### *History and Formulae of Explosives*

ALTHOUGH the manufacture of explosives is at the present time at its highest pitch, it has been difficult to find a text book dealing with this subject in a clear and concise way. In an effort to supply this want "A Manual on Explosives" has been produced by A. R. J. Ramsey and H. C. Weston (E. P. Dutton & Co., $1).

The subject has been handled by the authors in a clear, understandable way that will appeal to the layman who is interested in explosives, the chapter on applications of explosives being particularly interesting. The work is perhaps more valuable as a text book, as the formulæ are given and the chemical composition of each explosive explained.

*All literature described above is free of cost unless otherwise designated*

# struction, Fire Prevention and Protection

*In the Files of Every Architect, Contractor and Prospective Builder*

### *Holt Roof Connection*

DESIGNED to meet a very positive need, the Holt Roof Connection, manufactured by the Barrett Company of New York City, has already attained a high degree of popularity with architects, engineers and property-owners, and is destined to find still greater favor as its merits become generally known. Made entirely of copper and cast iron, the "Holt Connection with its roof-lock fittings and its very important expansion joint feature, is an ideal device and will absolutely prevent leaks around outlets, due to settling of roof deck caused by shrinkage or settlement, or expansion and contraction in the leader lines; and by entirely eliminating sheet metal outlet boxes it does away with the collapsing, condensing and leaks characteristic of that form of outlet. Its series of three gravel stops entirely prevents any loose gravel, leaves or roof rubbish from being washed into and clogging the down-spout."

THE Berger Manufacturing Company, Canton, Ohio, has a new trade mark, as shown herewith, which will be used in all the publicity of this concern in the future.

The matter received a great deal of consideration, and it was finally decided to offer a prize for that design selected for the trade mark.

The contest closed recently and M. A. Goodwin, a Chicago artist, was the winner, submitting the design shown.

The same company has just issued an interesting brochure on "Raydiant" sidewalk lights, which should be in the files of every architect.

This product was described in detail in the August, 1916, number of CONSTRVCTION.

### *Seeks New Fields to Conquer*

AFTER ten years of loyal and efficient service with the General Fire Proofing Company of Youngstown, Ohio, latterly as its sales manager, Paul B. Clark retired from the employ of the company early in the year, to direct the affairs of the Fireproof Products Company of New York City.

The little house organ of the company tells of the change in the following appreciative language:

"Paul R. Clark, sales manager of the General Fire Proofing Company, leaves that organization to assume direct charge of the affairs of the Fireproof Products Company of New York City, who are the New York agents of the General Fire Proofing Company. He was presented with a gold watch and chain yesterday by fellow employees, after an impressive leave-taking. He will be succeeded by William B. Turner, formerly advertising manager of the company, and well known in advertising circles.

Ten years ago Mr. Clark came to the General Fire Proofing as a "cub" salesman. How, through sheer energy, application and self-abnegation, he worked his way into the managership and affections of the entire Fire Proofing organization would make a romantic story—a model for either a novel or an object lesson.

"This was told at the farewell banquet yesterday. It was predicted there, before the presentation of his fellow workers' token of esteem, that Mr. Clark, who is still a young man, will attain even greater successes in the future. He leaves a host of regretful friends in Youngstown."

### *Johns-Manville Opens Office in Des Moines*

BY opening their new office at 911 Walnut Street, in Des Moines, Iowa, January 1st, the H. W. Johns-Manville Company brought the total number of their branches up to fifty-three. Practically every important city in North America now has a Johns-Manville Branch.

William B. Roberts, who has been with this organization for a number of years, caring for the Iowa sales, has been appointed manager of the new office, and will have under him a corps of salesmen and construction men to make a "Johns-Manville Service" a man-to-man service throughout that section of the country.

### *Sprinklers Modify Building Requirements*

Increases in areas of sprinklered building—66 2-3 per cent in buildings more or less fire resistive, and 40 per cent in all other kinds—are allowed in the new building code recently adopted by Dayton, Ohio.

These allowances will yield about the same result as those in the National Board Code, which specifies 100 per cent, for the Dayton Code restrictions are not as law.

The only compulsory sprinkler requirement is that of the State law for sprinklers in the stage section of theaters.

*All literature described above is free of cost unless otherwise designated*

**When the neighbor's house burns**

and fire-brands fly in the wind—there are thousands who can congratulate themselves on fire-safe roofs—roofs in shingle form, made from

**JOHNS-MANVILLE**

**Asbestos**

**Resistant to heat, water, wear and weather**

JOHNS-MANVILLE SERVICE COVERS THE CONTINENT

NOT only home roofs but big structures too enjoy its protection against time and fire. The farm silo and barn, the office building, the factory, the steel mill, all know Asbestos. Johns-Manville has developed Asbestos into hundreds of other useful forms; for the maintenance of industrial plants; as an ingredient of many manufactured products and household conveniences — wherever safety from fire and resistance to the elements and to chemical action are imperative.*

H. W. JOHNS-MANVILLE COMPANY
New York City
Branches in 55 Large Cities

* Asbestos Fabrics, Packings, Roofings, Shingles, Brake Linings, Building Materials, Electrical Devices, Heat Insulations, Refractory Cements, Waterproofing.

The Motor Car — The Farm — The Home — Industry — Power Plants — Transportation — Roofings

**When you think of Asbestos you think of Johns-Manville**

# SAFE HOMES

***Edited by* RALPH P. STODDARD, Secretary**
**Society Advocating Fire Elimination**

### *Publicity Pays!*

IT is a far cry from the Panama-Pacific Exposition to Cleveland, but evidence has come to hand that the effects of this Exposition have been felt almost three thousand miles away.

In the accompanying cut is shown a home built on the outskirts of Cleveland after the plan of the demonstration house erected by the Panama-Pacific Clay Products Exposition Company at the 'Frisco Fair.

Cleveland house built after plan of the brick house at San Francisco Exposition

This demonstration was the idea of Herman Matz, the well-known Chicago brickmaker, and the successful working out of the plan to erect it was due almost entirely to his unselfish efforts. The campaign to raise funds for the purpose was conducted by him, and a majority of the active work of management fell upon his shoulders. Close to a half million persons, it is estimated, visited the house during the Exposition. That of this number there were many thousands of converts in all parts of the country is proved by the Clevelander who patterned his home after it.

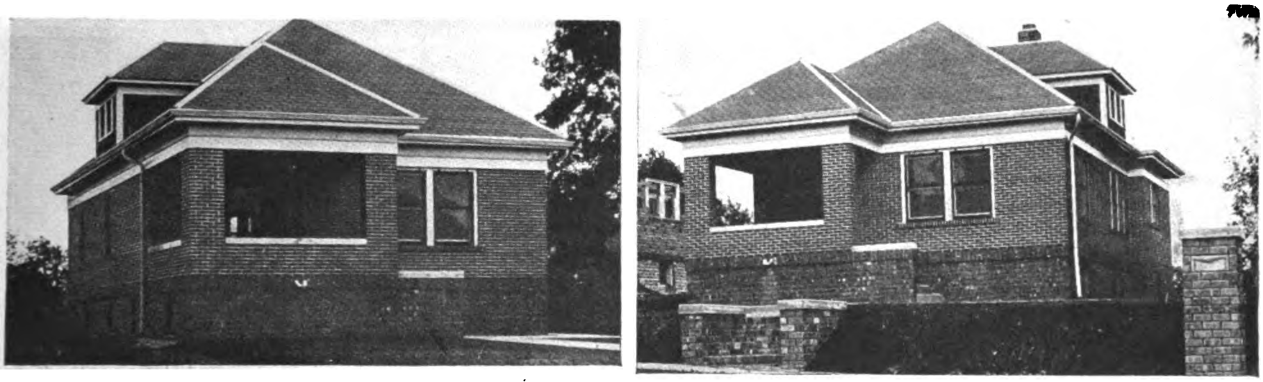
In the face of such evidences, it has proven surprising to those identified with the effort to promote the use of Safe materials, the indifference with which the brickmakers of the East are receiving the second National Building Show in New York in March.

It has remained for a live-wire from the Middle West, R. C. Mitchell, of the Barkwill-Farr Company, Cleveland, to "put over" a demonstration of clay products in this exposition.

To this end he has written letters to about eight thousand brick and other clay products makers, inviting them to contribute from $1 up—but in no case more than $5—toward defraying the expenses of this general educational exhibit.

"It is our greatest desire," says Mitchell, "to have the greatest possible number of clay workers interested in this exhibit. If we have the sort of response I expect, we will be able to make clay products as attractive to the prospective home builder who attends the Show as any other material exhibited there."

"Early responses to the letter are most satisfactory, and if the others act promptly the clay products people who go to the big Exposition in March will not be humiliated by finding theirs the only building material not on display."



Attractive "safe homes" designed by Adolph Lippman, Architect. Read his interesting letter on page 43

## *What One City Has Done*

EIGHTY-FIVE per cent gain in the number and a like increase in the amount of money expended for homes of fire-safe materials, in a city which has been always overwhelmingly "frame" in its tendency, is Cleveland's record for 1916.

This wonderful showing is attributed directly to the intelligent promotion work done by the manufacturers and dealers in permanent materials in the Cleveland territory through the Society Advocating Fire Elimination. The Safe takes credit for the creditable showing of those materials. A significant fact in connection with this increased use of Safe materials is found in the gain in fire-safe construction recorded in the suburbs. While the building departments of these do not keep classified records of building operations, a survey of new home building shows largely increased use of materials other than wood. In point of actual percentage, it is estimated the gains outside the city limits exceed even that within the corporation.

The promotion activities of The Safe extended to the suburbs as well, so that those interested in the Society's work claim these gains also are directly attributable to it.

Gains in the use of frame for home construction last year were 15 per cent over 1915. This makes a net showing for Safe materials approximately 70 per cent.

In drawing these comparisons only the figures for dwellings are used, as they constitute the only "open market" for competitive materials. Other types of buildings are so restricted as to type, occupancy and location as to virtually preclude any option on the part of the builder.

Safe materials, "running in the field against the favorite," have won out.

What has been done in Cleveland and its suburbs can be done by the manufacturers and dealers in any locality. Not one penny of money has been spent by the Society for paid advertising in the interest of permanent materials. It was a question simply of supplying information for which a demand already existed.

No difficulty was experienced in interesting the newspapers to the extent of using plans and other publicity with reference to Safe homes, and they were further encouraged by the great number of responses and inquiries for additional information from prospective builders. The result was, Safe home plans soon became a regular feature of some of these papers.

Nor was the interest confined entirely to the home builders themselves. Contractors were found, also, to be in quest of this sort of information. As a result of placing it in their hands, a number of so-called "speculative" builders of frame houses switched to Safe materials and built homes of this sort for sale.

In a single allotment within the city limits, six homes of fire-safe type were built, three of tile faced with brick and three of tile with stucco finish.

One real estate and building company is negotiating with material dealers for an entire street of houses of permanent type. This Fire-Safe street undoubtedly will be an accomplished fact before the present year ends.

The Complete Building Show added to the work done directly by the S-A-F-E in interesting prospective home builders in permanent materials. More than ten thousand copies of a single piece of literature, "Brick Homes at Low Cost," were distributed by the Secretary of The Safe for the face brick makers of Ohio. Scores of houses—a number of these in Cleveland—have been built from these plans.

The drawings submitted in the architectural competition, which was a feature of the show, showed

*Some of the interesting "safe homes"*

a large percentage of designs calling for the use of Safe materials. This book, also, inspired the erection of a number of homes in Cleveland and elsewhere.

Considered in the face of the fact material prices were higher than in 1915, Cleveland's record shows there is already present a market for the increased use of Safe materials and a little up-to-date salesmanship, which includes intelligent promotion work, is all that is required to profit by it.

◆

## The Most Complete Brick House Model

### (Photograph Shown on Cover of This Issue)

WHAT is probably the only exhibit of its kind in the country has been completed by the Detroit Brick Manufacturers and Dealers' Association. The display, the purpose of which is to advertise common brick, is a miniature brick house, complete in every detail, erected in the exhibit rooms of the Builders and Traders' Exchange of Detroit. The Exchange recently leased the entire fourth floor of the new Penobscot Building for its headquarters and exhibit rooms, where is displayed everything that goes in the making of a home or factory, and the brick house is the centre of attraction.

### Hand Moulded Miniature Brick

The house is 6 feet square and two stories in height, constructed entirely of hand-moulded miniature brick made from Detroit clay, the same as that which is used in the manufacture of Detroit's famous red brick. The miniatures are 3½ by 1¾ by 1 inches. The construction of the house was under the supervision of Stokes & Whittingham from plans prepared by William B. Stratton, architect.

*of Cleveland are shown on these pages*

### Complete in Every Detail

The house is complete in every detail. There is a living room, dining room, sun porch and kitchen on the first floor, with four bedrooms and bathroom on the second floor. It is lighted with electricity, has hardwood floors throughout and is completely furnished. The roof is of slate, cut in proportion to the miniature brick. Surrounding the house is a lawn, with gravel walks and shade trees. The house stands on a platform, or wall, 2½ feet in height, constructed of Detroit-made common brick, set up in English bond with white mortar joints, the same as the house, the wall being the only common brick exhibited.

### Educational Value Demonstrated

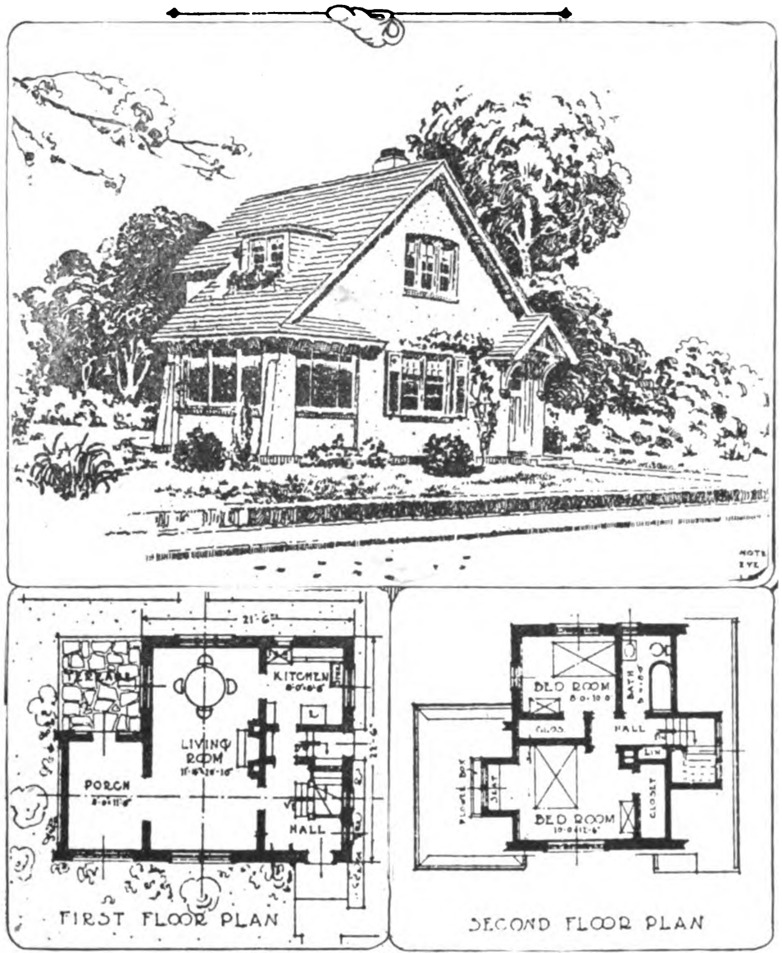
Two days each week various classes of children from the public schools of Detroit are invited to visit the Exchange exhibit headquarters, and prizes are awarded for the best essays written about the exhibits by the pupils of the different grades. Oddly enough, not a single essay has yet been written that does not mention the miniature brick house, which speaks volumes for the attractiveness of the miniature residence. Detroit architects visit the Exchange rooms daily with their clients for them to make their selection of materials and equipment.

◆

### Dealers Elect Officers

A. A. Kemper was re-elected chairman of the board of directors of the Supply Dealers' Board of the S-A-F-E at the annual meeting, Wednesday, January 3. W. T. Rossiter was chosen vice-chairman for another year and B. R. Taylor as treasurer. R. P. Stoddard continues as secretary of the Board.

A revision of its charter will be made to enable it to broaden its scope of activities in working out the various dealers' problems it has in hand.



HOLLOW TILE HOUSE FOR $2500

## Low Cost House of Tile

THE common belief that the low-cost house of Safe materials is an impossibility has been effectually discredited by the Art Commission of the State of Minnesota through a recent architectural competition.

The limit of estimated cost placed upon the designs in this competition was $2,500. As the aim was to provide a small home for a couple with a youngster or two, only two bedrooms were required. The growing practice in small houses of combining the living and dining rooms into one large room also was allowed. But the specifications were for a home of Safe materials and with a fire-resisting roof.

The little house shown in the accompanying cut is one of the many submitted in this contest. A study of the plan will show an excellent arrangement and a utilization of all available space.

Plans and other specific information regarding this little house may be had by addressing the Minnesota State Art Commission, 504 Essex Building, Minneapolis, Minn.

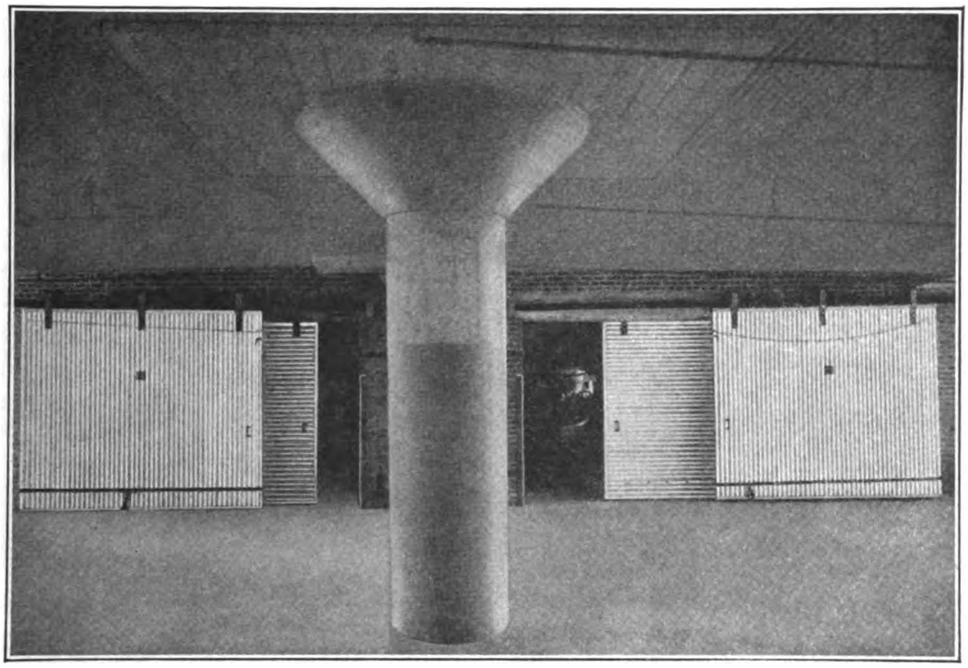
⁂

## Roofing Materials to be Tested

A FIRE test of roofing materials not now permitted in certain districts of Syracuse, N. Y., will be held in that city on the 30th inst. Charles F. Wisehoon, superintendent of the Building Department, will direct the test.

All makes of patented forms of roofing, all the standard forms of roofing which are not proprietary or patented and other materials will be tested.

The Board of Fire Underwriters suggested to the city authorities that the roofing standards established by them as the result of the tests conducted in their Chicago laboratories be accepted as the standards for Syracuse, thus eliminating the necessity for new tests. It was decided that while the full co-operation of the underwriters is desired it will be necessary for Syracuse to conduct its own tests.



## Protecting Openings in Fire Walls*

THE National Fire Protection Association, in its regulations for the protection of openings in division walls between separate buildings or sections of buildings, on the occasion of its nineteenth annual meeting, made the following statement:

"The great importance of fire walls as a safeguard to life in preventing the spread of fire, and the fact that they are liable to be severely exposed to fire for considerable periods, make it essential that all openings in such walls be protected by the most efficient methods."

Their Class A listing applies only to fire retardants of the best type, and in respect to fire doors for openings in fire walls, they state that "only such fire retardants are included in this class (Class A) as have been shown by experience and tests to furnish a high degree of fire protection when installed on both sides of walls and if used as exit doors, except as otherwise noted, to offer no serious accident hazard under normal or emergency conditions in this situation.

### Insurance Rate Reduction Based on Efficiency

Any fire door which has received the approval of the Underwriters' Laboratories of Chicago, when installed to fully meet the requirements of the insurance Inspection Bureaus having jurisdiction, will entitle the owner of the property to a reduction in his insurance rate; but this reduction is based on how efficiently the openings in the fire or division walls have been protected, because if the Underwriters have not extended their Class A Approval to the fire door that may have been installed, the rate reduction will not be as large.

It is to be further noted that fire doors labeled or listed by the Underwriters Laboratories in Class A are not necessarily uniform in quality or merit, and, consequently, while various kinds of fire doors may have received Class A Approval, which merely indicates compliance with Underwriters' requirements, some of these fire doors may be better made or more durable or possess features of superiority to other products in the same class.

### Tin Clad Doors Liable to Deteriorate

It is now generally admitted that fire doors made of two sheets of galvanized corrugated steel or iron and lined with asbestos paper are superior to the standard 3-ply tin-clad fire doors that have been on the market for so many years; and this is recognized by the Underwriters' Laboratories in their official statement that "standard tin-clad fire doors with 3-ply wood cores are fairly substantial in construction, practical under most conditions, easy to install, etc. . . . but under adverse conditions of service they are *liable to deteriorate rapidly and are difficult to maintain*"; whereas in their official statement regarding sheet metal fire doors of the type above mentioned they say that such doors are not only fairly substantial in construction, practical under most conditions and easy to install, but are *"durable and easy to maintain."*

Visit the
NATIONAL COMPLETE BUILDING EXPOSITION,
New York, March 5 to 11

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* Courtesy Merchant & Evans Co.

# Barrett Specification Roofs

*This is the Bond that guarantees your roof for 20 years*

Capital Stock $2,000,000.00

No. 2011

UNITED STATES FIDELITY & GUARANTY COMPANY
BALTIMORE, MD.

Barrett Specification Roof
20 Year Guaranty Bond

*Office Building of Nashville, Chattanooga and St. Louis Railroad, Nashville, Tenn. The owners are protected by the Barrett 20-Year Guaranty Bond.*

## Why We Can Afford To Give a 20-Year Guaranty

MANY people have asked, "How can you afford to give a 20-Year Guaranty on thousands of roofs all over the country laid by hundreds of different local roofers?"

Well, the answer is simple.

*First*, We know the materials are right because we manufacture them.

*Second*, The Barrett Specification, while it may seem complex to a layman, is straightforward, plain-sailing to experienced roofers.

*Third*, Under the guarantee plan the roof must be constructed under our supervision and receive our O. K. both as to materials and workmanship.

We further know from 50 years' experience that a Barrett Specification Roof, properly laid, will last a good deal longer than twenty years *without maintenance or repairs.*

A Barrett Specification Roof is constructed of five plies of Specification Felt, with a liberal quantity of Specification Pitch (the greatest waterproofing material known) between each layer.

No other type of roofing approaches a Barrett Specification Roof in the amount of protective waterproofing material used in its construction.

The weight of this waterproofing is not less than 235 lbs. to 100 sq.ft. compared with 75 to 125 lbs., at most, in other types of roofs.

And on top of all this waterproofing material is laid a wearing surface of gravel, slag, tile or vitrified brick.

*That's why it lasts. That is why we can safely guarantee it for 20 years.*

The 20-Year Guaranty is now given on all Barrett Specification Roofs of 50 squares and over in all towns in the United States and Canada with a population of 25,000 and over, *and in smaller places where our Inspection Service is available.* Our only requirements are that The Barrett Specification dated May 1, 1916, shall be strictly followed and that the roofing contractor shall be approved by us.

We believe the broadness of the proposition is without parallel, not only in roofing, but in the whole building industry.

*A copy of The Barrett 20-Year Specification, with roofing diagrams, sent free on request*

## The Barrett Company

***Largest Manufacturers in the World of Roofing and Roofing Materials***

New York Chicago Philadelphia Boston St. Louis Cleveland Cincinnati Pittsburgh
Detroit Birmingham Kansas City Minneapolis Nashville Salt Lake City Seattle Peoria
THE PATERSON MFG. CO., Limited: Montreal Toronto Winnipeg Vancouver St. John, N.B. Halifax, N.S. Sydney, N.S.

TRADE B MARK

**WEATHER:** Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

# The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

Copyright by Construction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., January, 1917

Priceless

## LUMBER INTERESTS IN NATION-WIDE ADVERTISING CAMPAIGN

Lumber manufacturers of this country have determined that 1917 shall be their banner advertising year, a decision resulting from a trip to the Pacific Coast of a group of Eastern, Southern and Northern lumbermen, in which the Pacific Coast manufacturers were plainly told that salvation for the lumber industry lay only in a most persistent national policy of advertising and trade promotion.

The "Billy Sundays" of the lumber world are enthusiastic over the prospects for national trade extension. Following are those who made the trip: R. H. Dowman, New Orleans, President of the National Lumber Manufacturers' Association, a leader of the cypress interests, who began the campaign for national advertising with the cypress campaign, in which more than $100,000 was spent; Charles S. Keith, Kansas City, president of the Southern Pine Association, which spends over $100,000 annually; F. E. Weyerhaeuser, St. Paul, of the Northern Pine Association, which expends large sums annually for trade extension; R. B. Goodman, head of the hemlock promotion campaign of Wisconsin, Michigan and Minnesota, which after half a year of work on a $25,000-a-year basis, added $20,000 a year for advertising birch; A. R. Turnbull, Norfolk, Va., President of the North arolina Pine Association, which this year will spend $50,000 to extend trade.

### Obtain Pledges of $210,000 for 1917

When these men told the West that advertising paid they obtained pledges from the Pacific Coast manufacturers amounting to $210,000 a year for national advertising of lumber.

At Spokane the Western Pine Association pledged $15,000 a year. At Seattle, Tacoma and Portland the West Coast Association prepared to increase its assessments to enter the general advertising campaign. The Timber Owners' Association also agreed to assist, and at San Francisco the pine and redwood men prepared to join the campaign, their contribution being $7,500 each.

### New Organization to Push Oak

Coincident with these reports is the formation of the American Oak Manufacturers' Association at Memphis, where lumbermen from every oak producing section of the United States met to organize the greatest hardwood association in the history of the industry. Some conception of the magnitude of the organization may be had when it is known that assurances of co-operation were had from practically all the leading manufacturers; and that 1,250 mills in the United States annually produce 4,400,000,000 feet of oak lumber, valued conservatively at more than $100,000,000.

### Colossal Wealth Back of Oak Interests

The American Oak Manufacturers' Association will represent hundreds of millions of dollars capital, besides hundreds of thousands of timber land acreage of inestimable value. This organization is, of course, in line with the industrial preparedness movement which is sweeping the country, and of which every day brings evidence that the lumber interests intend to push forward right into the front ranks in an effort to get the American home-builder to use wood throughout his building operations.

### Big Export Trade Planned

Business experts predict that after the European war lumber will be the American product in greatest demand in the old world markets. The lumber interests here are making every possible preparation to supply this coming demand.

But in preparing to ship lumber to war-torn Europe the lumber interests are not in the least neglecting the home fields. They are banded together as never before to make the widest and greatest national appeal and to lose no opportunity to capture every possible sale throughout the land.

### Every Kind of Lumber Officially Represented

Prior to the organization of the American Oak Manufacturers' Association oak was the only kind of lumber which did not have an organization back of it. Now the entire field is represented, and not only is each State and national organization doing its own work, but 1917 sees the first definite beginning of what will beyond all doubt be a tremendous concerted co-operative movement among all the branches to push wood as it never has been exploited before.

### The Men Back of the Movement

As one analyzes the personnel of these gigantic lumber associations—the strength, determination and vision revealed in their plans—it is not marveled at when note is taken of the men back of them, for they have as members the very largest manufacturers of lumber, men who are deeply interested in and actively associated with the work of the different organizations.

It is undeniable that the spasmodic and disunited advertising activities of the fire-safe material manufacturers have had much to do with this industrial awakening among the lumbermen. Now, the question is, are the unorganized fireproofing material men going to be contented with having set an example to the lumbermen, or are they going to bestir themselves and get onto the job so handsomely laid out for them by the

# *Looking Ahead!*

¶ Ninety-nine per cent. of all new building construction is not actually firesafe—

¶ —because proper fireproofing materials and protective devices are not purchased and properly employed.

¶ CONSTRUCTION is encouraging more stringent fire safety laws—bringing home to architects, owners and prospective builders a realization of the value of consistent firesafe materials—

¶ —developing a vast market for

CEMENT BRICK TERRA COTTA
GYPSUM STEEL HOLLOW METAL

METAL FURNITURE
FIREPROOF DOORS AND WINDOWS
FIRE SHUTTERS WIRE LATH

AUTOMATIC SPRINKLERS
CHEMICAL EXTINGUISHERS
FIRE ALARM SYSTEMS

This is *your* work and should be supported when your 1917 advertising schedule is laid out.

---

*The International* FIRESAFE *Building Publication*

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# CONSTRUCTION

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The *only* publication *exclusively* devoted to consistent, firesafe, building construction.

makers and suppliers of homes ready-made—to burn?

Already the situation has changed. *The lumbermen are now an example for the fire-safe material men to pattern after—a mighty example of the worth of business progressiveness and industrial organization.* There's no need to dodge the truth, and if the truth hurts, all the better—it may bring together some of the big men in the fireproofing business, who, at last realizing the seriousness of the situation, will band together as these giants of the lumber world have done and, like them, go forth on an evangelization trip over the United States, visiting the large manufacturers of fire-safe supplies, talking trade conditions with them, getting acquainted, sewing the seeds of co-operation — whipping together the tremendous forces latent all over the country and making for a great and all-powerful, all-telling national campaign which will educate the American people to the great need of living and working in structures which withstand, which act as barriers and which will eventually blot out the disgrace to American building intelligence now annually signified in our fire loss!

◆

## TRUS-CON'S SOUTHERN CAMPAIGN

H. MacRobert, Jr., has been appointed district manager in charge of the Carolinas, Tennessee, Georgia, Florida, Alabama, Mississippi and Southern Louisiana, throughout which territory the Trus-Con Laboratories, Detroit, Mich., manufacturers of waterprofings, dampproofings, floor hardeners and technical coatings of interest to the fireproofing industries, have launched an active campaign.

Mr. MacRobert has placed new men in the field to co-operate with the large number of representative dealers throughout the South who are alive to the opportunities which exist in selling the extensive line of Trus-Con products. Mr. MacRoberts' office will be at Atlanta, Ga.

Next convention of National Brick Manufacturers' Association will be held March 7, 8 and 10 at the Hotel McAlpin.

## NEW FIRESAFE CONCERNS

Sunset Potteries, Inc., Reno, Nev. Capitalized for $250,000. Directors, R. W. Fitzgerald, Jr.; F. R. Gibson, G. W. Taylor, E. Cheney and J. S. Sinai.

Virginian Potteries Company, Charleston, W. Va. Capitalized at $300,000. Incorporators are W. A. Abbott, Herbert Frankenberger, L. E. Poteet and F. S. Rhodes, of Charleston, and L. E. Holderman, of New Lexington, Ohio.

Staunton Clay Products Company, Pittsburgh, Pa., to manufacture brick, tile and other clay products. The capital stock will be $300,000. Incorporators are Corry H. Fory, Newark, N. J.; L. R. Cunningham and M. J. Dain, Pittsburgh, Pa.

H. J. and J. J. Schneider, owners of two clay products plants at Laurel, Miss., and Pearl River, La., have started construction of a large brick manufacturing plant at Beaumont, Texas, to begin operations in February with a daily capacity of 50,000 bricks. Hollow tile will be manufactured later.

W. W. Lewis, who operated a tile plant at Hoytville, Ohio, will expend $40,000 to construct a new brick and tile plant at North Baltimore, Ohio.

Rapid Service Face Brick Company, Detroit, Mich., has been organized with a capital stock of $100,000. Harold W. Holmes, Frederick B. Stevens and Ralph Spencer are stockholders.

E. P. Swaset, L. B. Wheelock and William Henry have obtained a charter for the Portland Cement and Brick Manufacturing Co., Portland, Me.

Worcester Brick Company, Mass. Capitalized at $60,000. Officers are G. L. Baldwin, F. H. Robson, Isaac McLean, all of Worcester.

Magnesite Refractories Company, Porterville, Cal., with a capital stock of $200,000. Harry L. Doyle is manager.

## *An Interesting "Safe Homes" Letter*

From Adolph Lippmann, Architect, Maryville, Mo.

Gentlemen:

These houses (see page 35) do not cover a great deal of ground, but they are FIRE S-A-F-E, well finished inside and equipped with modern devices.

No wood whatever in the basement, and the latter is set well above the grade to afford plenty of light and ventilation. With tile at the bottom of footings covered with crushed rock, and the walls up to grade covered with two coats of hot pitch, makes these concrete-floored basements perfectly dry and a pleasure in which to spend much of the day.

Making use of medium or low-priced face brick, these exterior walls can be built for 10 per cent more than those of the ordinary frame construction.

What a HIT the brick manufacturers could make by showing the public that brick has remained stationary in price, while nearly all other articles and building material have advanced sky high.

Phone, Cuy., Lake 93 Phone, Bell, Marlo 1672

THE LAKEWOOD MASON SUPPLY CO.

DEALERS IN

BUILDERS SUPPLIES

and IRON SPECIALTIES

Alpha Portland Cement, Bulk Lime, Hydrate Lime, Plaster, Sewer Pipe, Flue Lining, Const. Tile, Drain Tile, Brick, Fire Brick, Fire Clay, Crushed Stone, Sand, Slag, Mortar Colors, Waterproofing, Floor Tile, Angle Iron, Dampers, Ash Dumps.

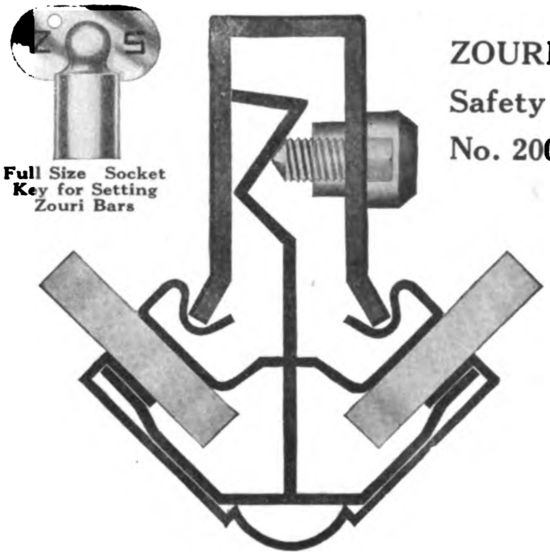
OFFICES AND WAREHOUSE:

11201 BEREA ROAD

LAKEWOOD, O.

# ZOURI

## Safety Store Front Construction



**Full Size Socket Key for Setting Zouri Bars**

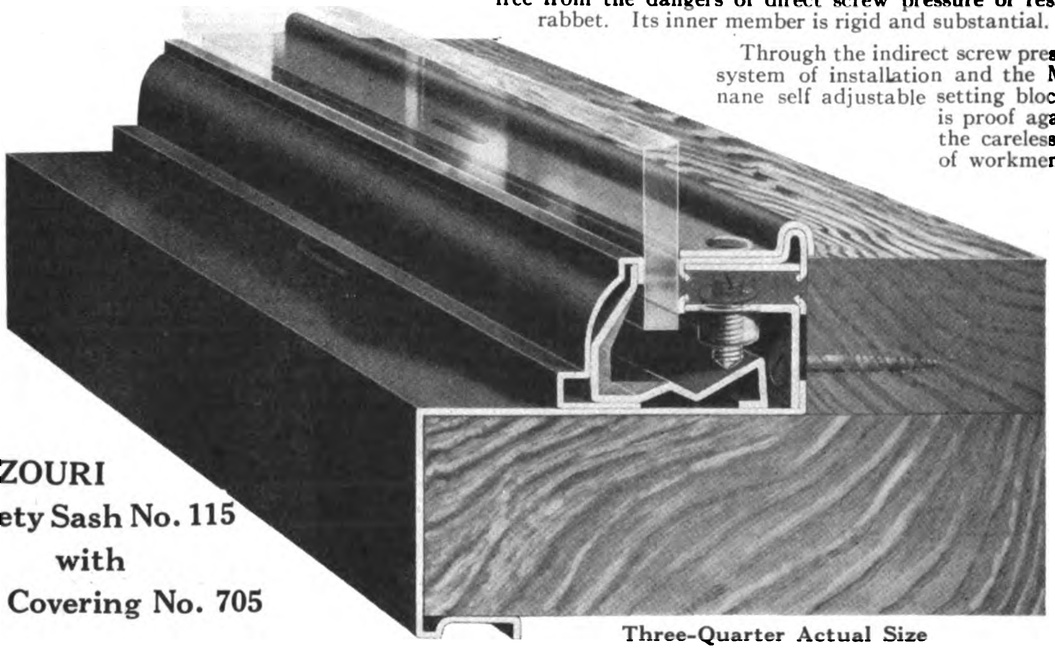
**FULL SIZE**

ZOURI
Safety **Key-Set Corner Bar**
No. 200

Zouri Safety Key-set Corner and Division Bars are free from direct screw pressure. They are proof against the carelessness of workmen. They can be set only with the small special socket key shown, so that undue pressure cannot be exerted by the tools used in the building line, the power of which is beyond control. These bars are specially constructed so that the edges of the glass **cannot** come in contact with the metal.

The Zouri Safety sash is ornamental and the safest known setting for plate glass. There are no screws visible. It is free from the dangers of direct screw pressure or resilent rabbet. Its inner member is rigid and substantial.

Through the indirect screw pressure system of installation and the Murnane self adjustable setting block, it is proof against the carelessness of workmen.



ZOURI
Safety Sash No. 115
with
Sill Covering No. 705

Three-Quarter Actual Size

***DETAILS MAILED ON APPLICATION***

# Zouri Drawn Metals Company

**1813-1833 East End Avenue** **Chicago Heights, Illinois**

**Operating under Murnane and Marr Patents**

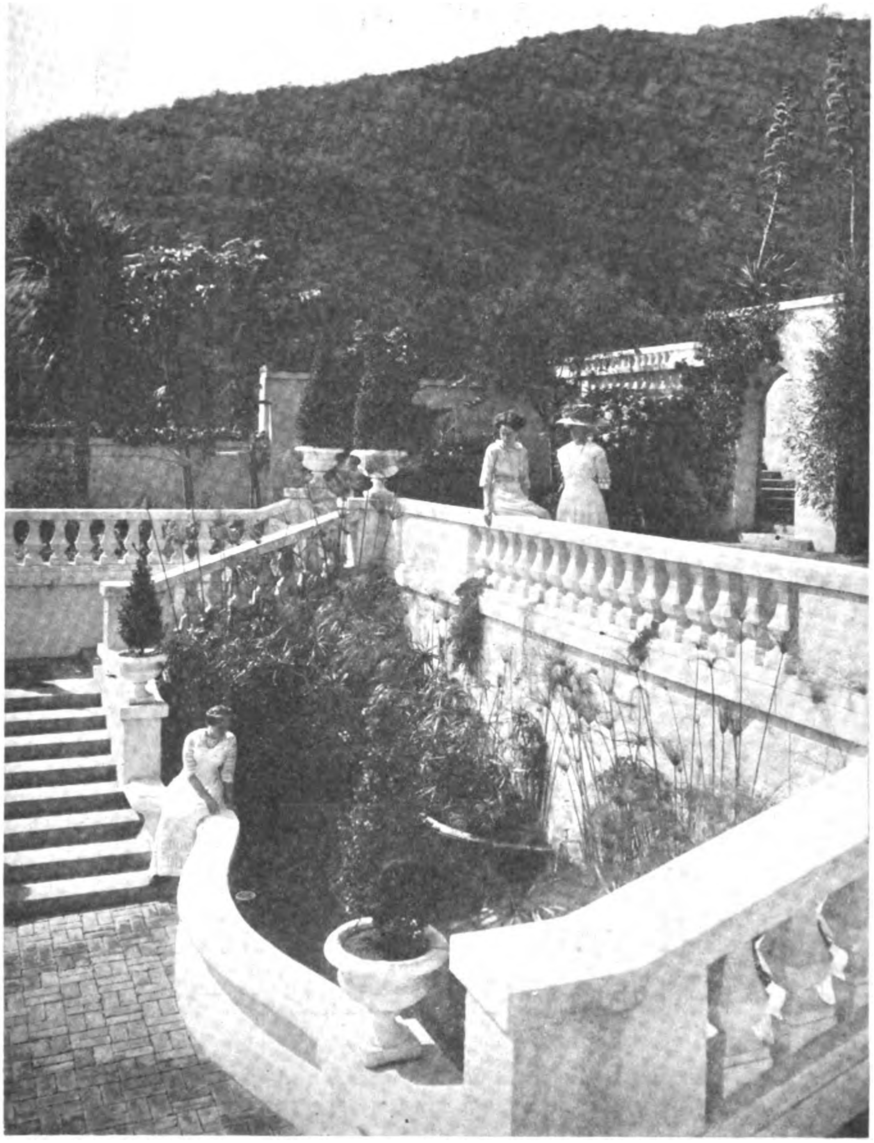
**AGENTS IN THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA**

## ARCHITECTURAL CONCRETE

A study of the development of concrete as a building material shows, anmong other things, the wonderful variety of uses to which it may be put; and no field illustrates its extended adaptability more than that of architectural ornamentation. A volume might well be devoted to exploiting the service of cement-concrete as a building beautifier. Structurally first utilized only for unimportant work, it quickly advanced solely upon its proven merits to take its place as one of the most important parts of the greatest structures. As a medium for architectural ornamentation it is entering an ever-widening field. One wonders, not how much it is capable of but where it cannot be adopted!

The accompanying illustration gives an adequate conception of the possibilities of cement-concrete for decorative service both in a small way, for flower pots, garden seats, pedestals, stands, urns, etc., and for what may rightly be termed gigantic landscape plans, as is evidenced in the gardens of G. W. Wattles, Hollywood, Cal., which are from the designs of Elmer Grey, Los Angeles, one of the noted architects of the Pacific Coast.

It is one of the few terraced gardens that is terraced upwards from the house instead of vice versa. A vast gash was excavated in the hill back of the house in order to make possible the work, but the disfigurement of the landscape occasioned thereby was entirely rectified by the system of walls, steps and terraces constructed of cement and by the planting. The work was done by day labor. Mr. Grey personally supervised construction. The finish is of Medusa White Portland Cement.



Cement in garden construction work

◆

From all over the country come reports indicating the serious trade handicap caused by lack of freight cars. Many commissions have been appointed to investigate the matter. The following will serve as an illustration of the results of the present situation, which, it is hoped, will soon be relieved. At Cleveland, Ohio, for instance, the Interstate Clay Products Company recently stated that it it had on file unfilled orders for 1,383,000 pieces of hollow-tile, equivalent to 9,100,000 ordinary brick. An inability to get empty cars is the reason for this.

◆

Hazelton Brick Company, Hazelton, Pa., will erect a number of brick dwellings of modern type, to be used for workmen. The company is also planning many additions to its plant.

◆

In its case against the Pennsylvania Railroad the National Fire Proofing Company has received by decree of the Interstate Commerce Commission an allowance of $1,497.79, because of an unfair rate charged on sixty-eight carloads of hollow building tile, shipped from Hobart, Ind., to Memphis, Tenn.

◆

American Face Brick Company, Cleveland, Ohio, has been incorporated with a capital stock of $25,000. John Harms, A. L. Bishop, R. A. Hayes, K. E. Gough and G. K. Allgeier are the incorporators.

Victor Brick Company, Philadelphia, Pa., has been incorporated with capital stock of $130,000 by F. R. Hansell of Philadelphia, George H. Maruin and S. C. Seymour of Camden, N. J.

Huntington Clay Products Company, Huntington, W. Va., has been organized, with capital stock of $100,000.

REYNOLDS
FIRE SAFE
APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS
TRADE MARK
H.M.R.
ESTABLISHED 1868
SHINGLES

TESTED by the Underwriters laboratories under their standard tests, Reynolds Shingles have proven themselves worthy of classification as fire preventatives.

Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.

If your dealer cannot supply you write the factory.

CLASS C

**H. M. Reynolds Asphalt Shingle Co.**
"Originators of the Asphalt Shingle"
Grand Rapids MICHIGAN

Do Business by Mail

It's profitable, with accurate lists of prospects. Our catalogue contains vital information on Mail Advertising. Also prices and quantity on 6,000 national mailing lists, 99% guaranteed. Such as:

War Material Mfrs. Wealthy Men
Cheese Box Mfrs. Axle Grease Mfrs.
Shoe Retailers Auto Owners
Contractors Tin Can Mfrs.
Druggists Farmers, Etc.

Write for this valuable reference book; also prices and samples of fac-simile letters.
*Have us write or revise your Sales Letters.*

Ross-Gould, 1001 Olive St.

**Ross-Gould**
**Mailing Lists St. Louis**

# If you are a Manufacturer *of* Firesafe Material or Protective Devices,

**consistent presentation—in season and out—of your product in CONSTRVCTION cannot fail to result favorably because the success of this publication depends upon**

**(1) how well it advances and proves the argument for proper fireproofing**
**and**

**(2) what it actuall accomplishes to increase the use of firesafe materials and devices.**

**The first objective is attained (intensively) through the editorial, news and advertising sections of CONSTRVCTION and (extensively) by sending the magazine over the entire country to all the business and professional interests related to building planning, construction, equipment and maintenance.**

**The second purpose is accomplished by** ***actively fighting for legislation favoring firesafe construction*** **and against laws permitting the continued use of wood——and remember that no company can do this work as effectively as a publication, that the "fireproofing fraternity" at present is a composite unorganized body comprising a number of separate units representing more than a dozen industries, that there is practical need of a national mouthpiece such as you have in CONSTRVCTION, that** ***makers of fireproof materials are now getting but one per cent of the business which ought to be theirs,*** **that advertising in CONSTRVCTION is helping yourself to get more orders, giving your goods the representation they deserve—and according this publication the co-operation it merits.**

*She:* "If we must cut down expenses, why not drop your life insurance?"
*He:* "Not much. That's *your* insurance, not mine. I figure we can trim about all the other items so as to save at least $400 a year, and I'm going to take a hundred of that and buy another Postal policy while I can get it. You and the kiddies may be glad some day."
*She:* (thoughtfully) "I guess you're right at that, Jim."

## Put Life Insurance in Your Family Budget —and Keep It There

THE *real* husband always makes a liberal allowance for life-insurance whether his wife wants him to or not, but the sensible woman *does* want him to when she considers it seriously.

And whether times are hard or easy they both want the most protection possible for their money, and hundreds of them during the last decade have therefore been turning to the

## POSTAL LIFE INSURANCE COMPANY

The Postal employs no agents but issues its policies direct. Agents' commissions and office-expenses are thus saved and go to its policyholders.

It is not alone the Company of Safety and Service but also of Saving, for you will find net cost low—lower than ever before—because the Postal's actual underwriting experience has enabled it now to make a

**10%** reduction in premium rates with a continuance of the annual guaranteed dividend of **9½%**

***Besides these savings, the Company pays the usual contingent dividends, depending on earnings.***

If you are in good health you should take advantage of the 10% reduction in premium-rates and other Postal economies.

### Find Out How Much *You* Can Save At Your Age

on any standard form of Policy—Whole-Life, Limited-Payment Life, Endowment, Joint Life, or on a Monthly Income Contract.

The Postal issues all of the standard forms, and operates under the strict supervision of the New York State Insurance Department and is subject to the United States Postal authorities.

To get exact figures for your age, simply fill out the coupon and mail today.

Remember: No agent will be sent to visit you. The Postal Life employs no agents; resultant commission-savings go to *you* because you deal *direct.*

**POSTAL LIFE INSURANCE COMPANY**
WM. R. MALONE PRESIDENT
THIRTY-FIVE NASSAU STREET NEW YORK

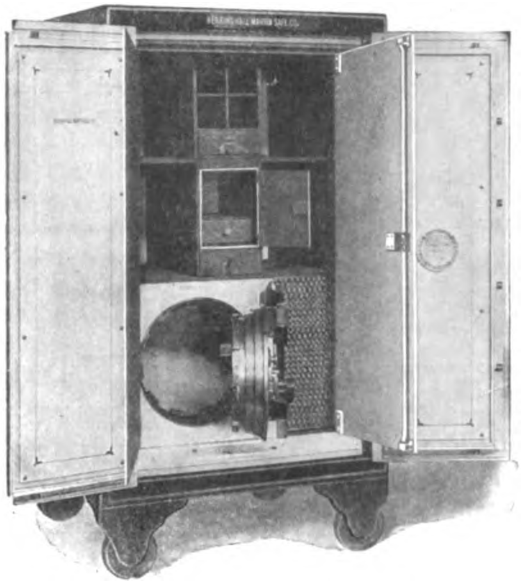
**Postal Life Insurance Company**
**35 Nassau St., N. Y.**

Without obligating me, please send full insurance particulars for my age.

*Name* ........................
*Address* ........................
........................
*Occupation* ........................
*Exact date of birth* ........................

# HERRING-HALL-MARVIN SAFE COMPANY

*Designers and Manufacturers of*



**Fireproof and Burglarproof**

## SAFES, VAULTS & SAFE DEPOSIT BOXES

**For Offices, Residences, Banks and Bankers**

***We offer the benefit of our experience of over seventy-five years in the manufacture of fire and theft-resisting safes and vaults and specially constructed Burglarproof equipments for Banks and Safe Deposit Companies.***

**Plans and Specifications furnished without cost**

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***Birmingham, Ala.*** ***New York, N. Y.***

STATE ARMORY, AKRON, OHIO
STEEL-TILE FLOORS
*Architect:*—KARL I. BEST, State Architect
*Contractors:*—CLEMMENS & JOHNSON, Hicksville, Ohio

# Fireproof Floors

GF STEEL-TILE floors have many exclusive advantages—they are sanitary and fireproof, and mean substantial, durable construction. And this with only a slight increase in initial cost over wooden floor construction, which is more than offset in a short time by reduction of maintenance, expense and insurance rates.

**GF Steel-Tile**

are permanent steel forms by which a series of T-beams (see cut below) connected by a thin slab of concrete are formed, which safely carry all loads to their bearings. Occupying that part of a heavy reinforced concrete floor which is unnecessary to strength, they save from 35 to 50 per cent. in concrete, yet without sacrificing load carrying capacity.

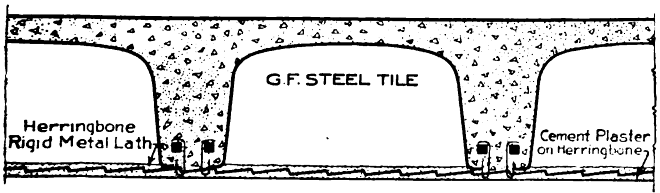
But the saving does not end here; lighter floors mean lighter supporting members through to the footings of the structure.

Only a simple shoring is required under each joint; the Steel-Tile are actually forms and carry all the concrete except the narrow joist.

Learn more about the uses of GF Steel Tile.

**GET THE STEEL-TILE HANDBOOK** giving general specifications for reinforced concrete, working formulas for reinforced concrete design, and tables of safe loads for floors.

**THE GENERAL FIREPROOFING CO.**
**802 Logan Ave., Youngstown, Ohio**



# How Much Fuel Are Your Windows Wasting?

You can secure (at least for a time) fire-safety by installing cheap, "leaky" fire retardant windows in your building. But how much fuel will you waste in a year, due to the escape of heat through these windows?

# POMEROY

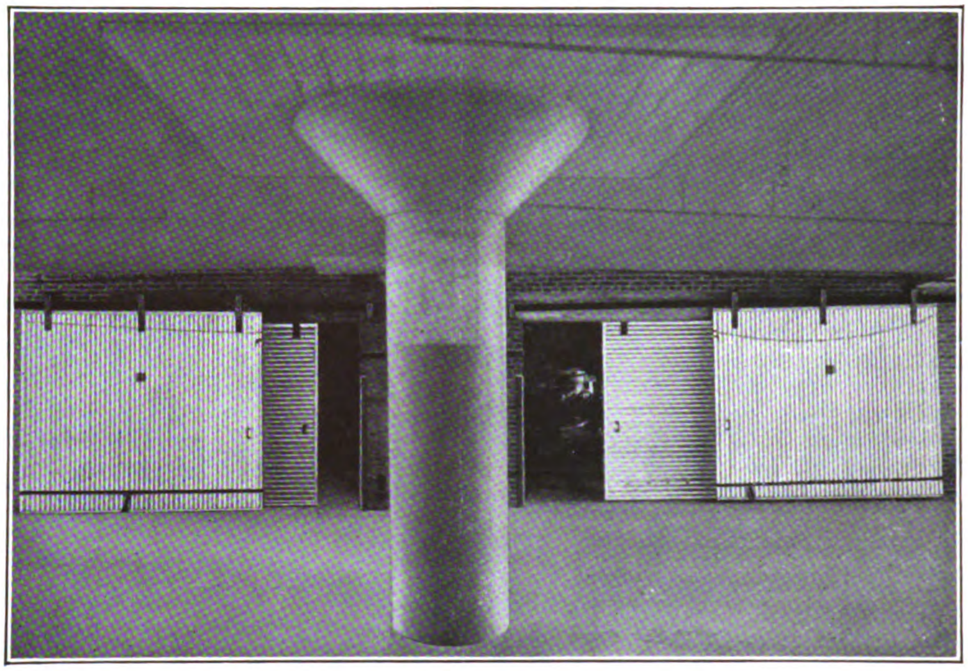
## Hollow Metal Fire Retardant

# Windows

Are so thoroughly well made, so perfectly fitted, so superior in weather qualities, that the saving in fuel they bring about makes them the least expensive windows that an owner can install, even at a higher first cost. In **Pomeroy** Windows you get maximum fire-safety and maximum fuel economy. Both of these contribute to the earning power of a building.

Let us send you the literature
on **Pomeroy** Protection.

**S. H. POMEROY**
**COMPANY, INC.**
**30 EAST 42ND STREET NEW YORK**



**Pennsylvania Railroad Freight Station, Philadelphia, Pa.**

# INSTALLATION
## OF
# EVANS "ALMETL" FIRE DOORS

PAT. PENDING

**Constructed and erected** to meet the strictest requirements of the Underwriters, Evans "Almetl" Fire Doors have proved an economical and dependable fire protection in some of the largest industrial plants in the country.

**DEPENDABLE**—Because of their rigid, all-steel and asbestos construction.

**ECONOMICAL**—Because they secure the lowest possible insurance rates and once installed cost nothing to maintain.

**Our Descriptive Booklet** giving further details will be sent upon request to Dept. "B-28."

**"Merchant's Old Method" Roofing Tin**
**Fire Retarding "Star" Ventilators.**

---

# MERCHANT & EVANS CO.

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*The International* FIRESAFE *Building Publication*

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C. Stanley Taylor, Sec.-Treas.

Entered as second-class matter November 3, 1915, at the post office at New York, under the Act of March 3, 1879.

The building laws of many states recognize plaster over metal lath as suitable construction for fire resisting stair soffits and walls in factories, stores, etc.

**Kno-Burn**

TRADE MARK

**Expanded Metal Lath**

is the *standard* lath for all types of construction. Its fine mesh cuts down the amount of plaster. Its smooth surface is easy and quick to plaster over. Its mesh keys the plaster firmly and permanently to it.

Let us send you complete data on our full line. Ask for Booklet 583.

**North Western Expanded Metal Co.**

***Manufacturers of all types of Expanded Metal***

**958 Old Colony Bldg., Chicago, Ill.**

*.. The ..*

**BARKWILL-FARR CO.**

*BRICK and TILE*

MADE RIGHT
SOLD RIGHT
DELIVERED RIGHT

Cleveland, Ohio

***"The Largest Fire Insurance Company in America"***

**ORGANIZED 1853**

ELBRIDGE G. SNOW, President

**"Service" in Fire Insurance**

**Fire Insurance, as issued by THE HOME INSURANCE COMPANY OF NEW YORK, means something more than Indemnity for Loss or Damage due to Fire and other causes.**

**It means a "SERVICE" to Policyholders which is unexcelled. The Company's equipment includes:**

**1. Experts in every branch at its Head Office and in the Field.**

**2. Agents throughout the United States and its possessions, and in Canada, to write Policies.**

**3. Complete facilities for the Prompt Adjustment of Losses.**

**The advice which may be had gratis from the Department of Improved Risks, located at the Head Office, will be found especially valuable to large insurers.**

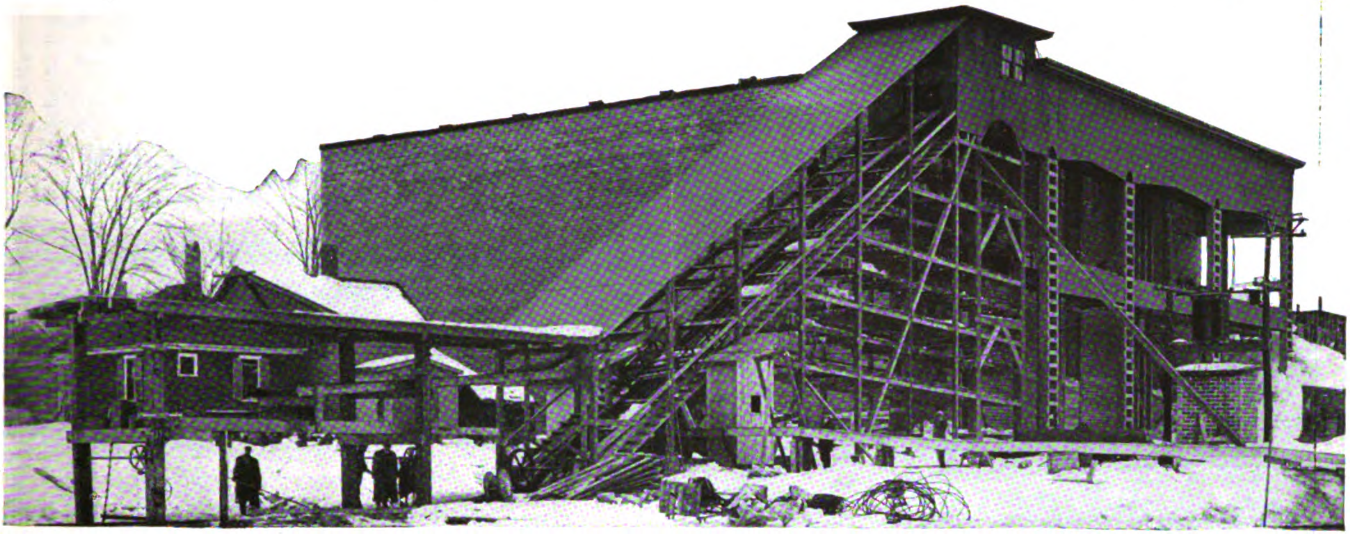
**Ask any "HOME OF NEW YORK" Agent, or address inquiry to Department of Improved Risks, 56 Cedar Street, New York City.**

**ALL BRANCHES OF FIRE INSURANCE**

**Automobiles, Commissions, Hail, Marine (Inland and Ocean), Parcel Post, Profits, Registered Mail, Rents, Sprinkler Leakage, Tourists' Baggage, Use and Occupancy, Windstorm.**

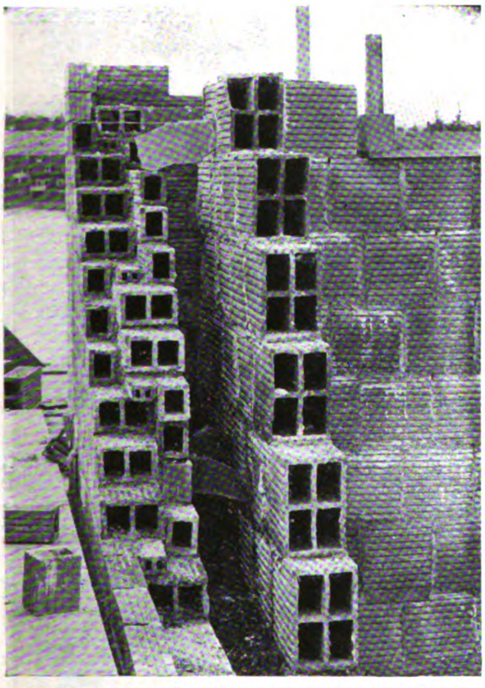
**STRENGTH REPUTATION SERVICE**

# This Ice House Over 99% Efficient



## *The architects specified*

# NATCO·HOLLOW·TILE



*Ice House erected by Crystal Lake Ice Co., Newton Centre, Mass. Morton and West, Boston, Architects. McDonald and Kivell, Boston, Builders.*

*Approximately 100' x 100' x 40' high; divided into three compartments by interior walls.*

*Outside walls 28" thick, consisting of: 12" outside section built of NATCO Hollow Tile, smooth on the outside; 8" interior section of 8" NATCO Hollow Tile, and 8" air space between the two sections. This air space filled with ground cork up to approximately 30' from ground, and above this height with sawdust.*

*Interior dividing walls of 8" NATCO Hollow Tile built between Bethlehem girder beams 14' on centers and for full height of building (40').*

*Approximately 800 tons of NATCO Hollow Tile used.*

THE BUILDER'S GREAT PROBLEM in constructing ice houses is to provide thoroughly efficient insulation. Any melting, or "shrinkage," of the stored ice is a dead loss.

If there is melting at the bottom tiers of ice, the ice often tips and slides against the walls, causing bulges and frequently extensive damage.

The architects called in by the Crystal Lake Ice Company for its ice house planned and built during 1915 at Newton Centre, solved the problem with Natco—chosen in direct comparison with other materials.

The six air spaces in the 28-inch Natco wall insured such efficient insulation that the shrinkage was less than 1%, against the 5% expected.

WHEN THE FIRST COMPARTMENT WAS OPENED, the top tier showed no meltage, while the second tier showed "planer marks." Ice against side walls had melted only 4" to 6" next to the walls and for a depth of only 3' from the top. The ice next to the interior division walls showed practically no meltage. In a *wooden* house, often a man can walk around between the ice and the outside walls when a pocket is opened.

In this Natco ice house there was no sliding of the ice. Not more than $10 was expended for repairs. Even this negligible damage probably was done in filling, the architects stated, and could have been avoided.

Here are the architects' arguments for Natco construction:—

**"This form of construction—while costing more than wood—has proved cheaper on account of: low maintenance cost; better suitability for storage; appearance; serviceability. It is superior to concrete because it is a better insulator against heat; and, as it is composed of small tile units, repairs are simple to make, where, in the case of concrete damaged, they would be very expensive.**

**"The first year of service for this house has been one of perfect satisfaction in all respects."**

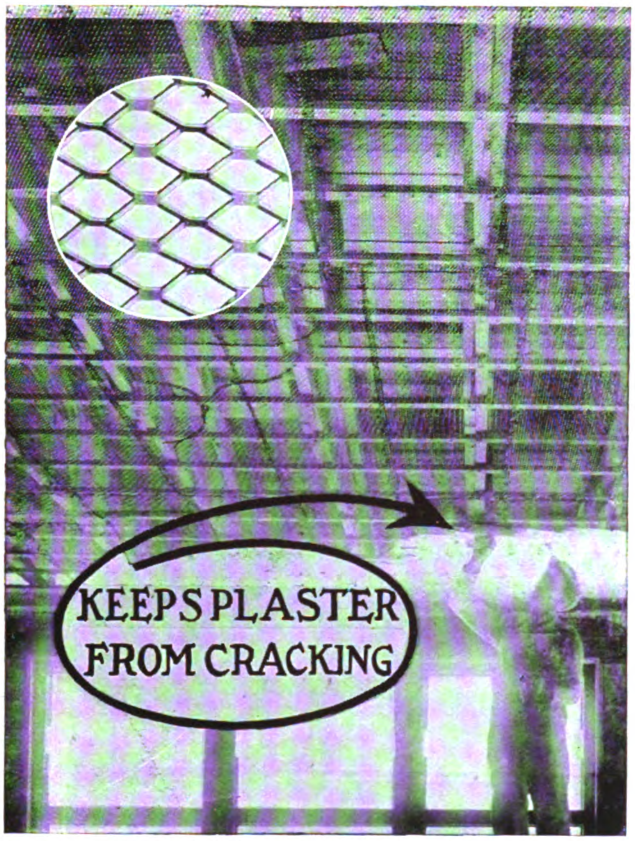
Such successful uses for Natco extend still further the opportunities for architects who specify Natco. Send for full information from your nearest Natco office.

## NATIONAL·FIRE·PROOFING·COMPANY

**604 Federal Street, Pittsburgh, Pa.**

*Other Offices:* **New York Chicago Boston Detroit Philadelphia Washington Syracuse**
***23 factories in the United States***

**NATIONAL FIRE PROOFING COMPANY OF CANADA, Ltd.**
**Office at Toronto and Factory at Hamilton, Ontario, Canada**



PROVIDE the walls and ceilings of your buildings with a secure foundation to receive the stucco and plaster and hold it firmly in place.

You will eliminate unsightly cracks and falling plaster by using

# Berger's Expanded Metal Lath

The small diamond-shaped meshes allow a perfect "key," completely imbedding the lath in the plaster, reinforcing it at all points, giving great strength with the minimum amount of plaster.

Berger's Expanded Metal Lath is not affected by moisture or temperature changes, hence cannot swell, warp nor stain the plaster. It is *fire resisting*, vermin and sound proof, and prevents rats and mice from making holes through the walls.

It is free from sharp edges to cut and injure the hands and can be easily formed into small members for cornices, coves, beam and column covering, etc.

The large sheets (8 feet long and 18 and 24 inches wide) make application speedy and easy.

Used extensively and effectively for plaster, stucco and "overcoating" old houses.

*Write now for interesting Expanded Metal Lath Booklet F. C.*

**The Berger Mfg. Co.**
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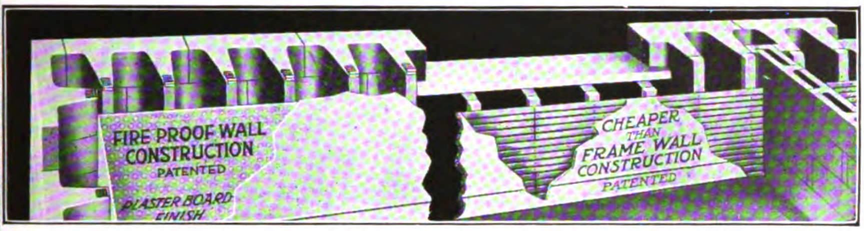
# Synstone Products

## *The Last Word in Concrete Construction*

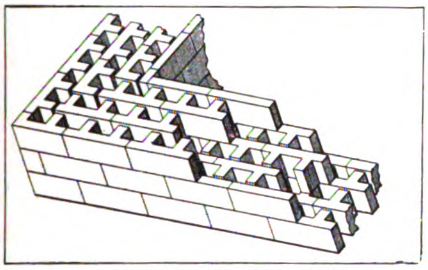
Wet Process, making real concrete walls impervious to heat, cold and moisture, fire proof and everlasting. Hollow Concrete Walls, stronger than brick, faced with beautiful natural materials—crushed granite, marble or sands—with all the sparkle and life of natural stone. Brick or stucco facings may be used if desired. Blocks immediately removed from machine using a wet, soggy mixture 1 cement, 2½ sand, 4 parts of 1″ stone or gravel—producing stone withstanding 3,000 lbs. pressure per square inch and 1700 degrees of heat for two hours without injury.


FIRE PROOF WALL CONSTRUCTION
PATENTED
PLASTER BOARD FINISH
CHEAPER THAN FRAME WALL CONSTRUCTION
PATENTED

**50 blocks (100 sq. ft. of wall) made per hr. 30 to 75 sq. ft. laid per hour by one mason, two helpers.**

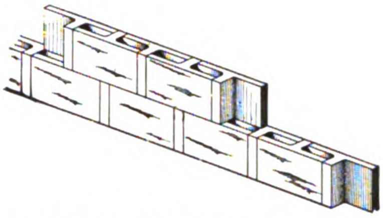
**Average cost per square foot of wall made and laid unfaced 11.4c faced 12.7c.**

Synstone Single Wall for residences and any three-story construction, 9″, 10″, 12″ or 13″ thick. **Half as much material and labor used in making, less than half as much time in laying, as any other wall.** Inner wall wood lath and plaster, metal lath or plaster board. 9″ wall 50% hollow; stronger than 12″ brick wall, costing no more than frame construction in most places.



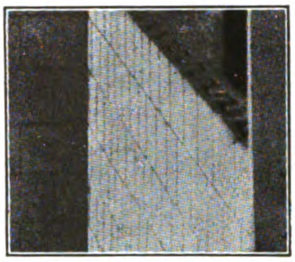
**MULTIPLE AIR SPACE WALL**

Synstone Wide Wall Construction (multiple air space). 50 blocks (100 sq. ft.) made per hour. Ideal construction for cold storage or packing houses. 19½″ to as many feet in thickness, as desired. Absolutely impervious to heat.



**DOUBLE HEADER PARTITION WALL**

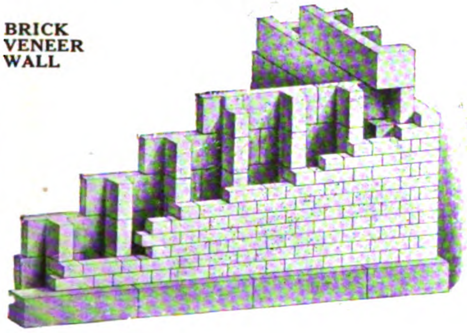
3″ to 12″ in thickness. Strongest masonry wall that can be constructed. 50 blocks (100 sq. ft. or 50 sq. ft. of wall) made per hour.



**DOUBLE SOUND-PROOF PARTITION WALL**

One or both sides may be faced, requiring no plaster, 4″ and up in thickness. 50 blocks (100 sq. ft. or 50 sq. ft. of wall) made per hour.

**BRICK VENEER WALL**

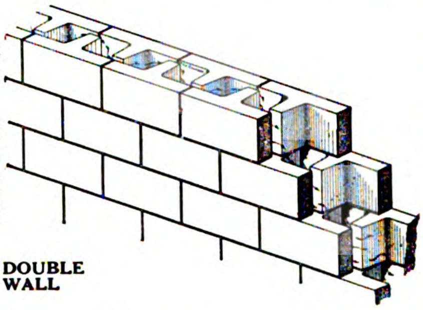


**50 blocks (100 sq. ft. of wall—inner wall) made per hour, and laid in one-third the time required for brick.**

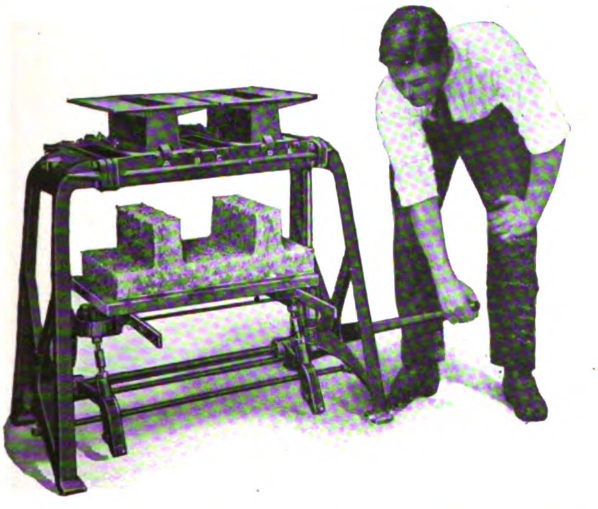
Synstone Inner Wall, with pressed or art brick facing, bonded together with header bond. Large saving in cost over solid brick construction, 12½″ or 16½″ thick.

**50 blocks (100 sq. ft. or 50 sq. ft. of wall) made per hour.**

Synstone Double Wall, for heavy construction, 11½ to 18″ in thickness, 33⅓% to 50% hollow. Large saving in cost over brick walls.



**DOUBLE WALL**

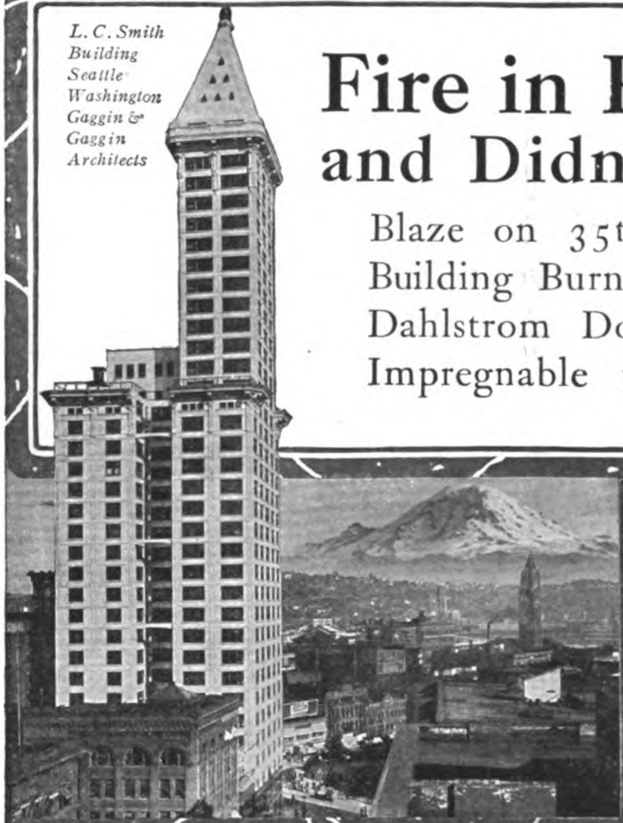


SYNSTONE MACHINERY is very carefully made and thoroughly complete in every detail, making all these walls and the different shapes and sizes of blocks required for them, by simply changing the cores, which is done in thirty seconds. Operated by common labor, 1, 2 or 3 men. Above estimates (50 blocks, 100 sq. ft. per hour) are based upon 2 men with mixture supplied to them.

PLANT. Just as good and beautiful material can be made in a shed as in an expensive factory. Do not let your material freeze or dry out. Keep moist for two weeks, when it is ready for the wall. Complete machinery C. I. F. New York $287.50, no royalty.

## The Ferguson Synstone Company

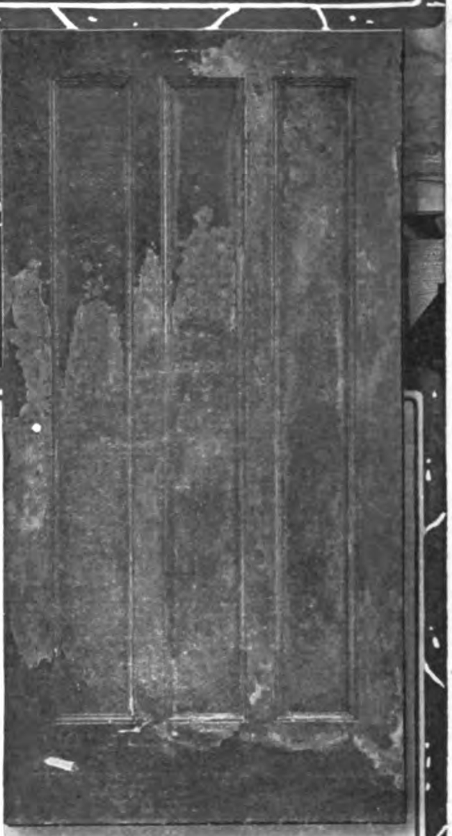
**Century Building, Denver, Colorado, U. S. A.**
**Cable Address: "SYNSTONE" Denver. Code—Western Union.**
**REFERENCES: Dun or Bradstreet Commercial Agencies or United States National Bank, Denver.**



*L. C. Smith Building Seattle Washington Gaggin & Gaggin Architects*

# Fire in Pipe Shaft and Didn't Know It

Blaze on 35th Floor of This Building Burns Out Unnoticed. Dahlstrom Door Again Proves Impregnable to Raging Fire.



## Door Finish Only Damage Reverse Side Unblemished

Gasoline, oil soaked waste, brooms, brushes and other inflammable material burned behind this door unnoticed, damaging only the side exposed to the flames as shown.

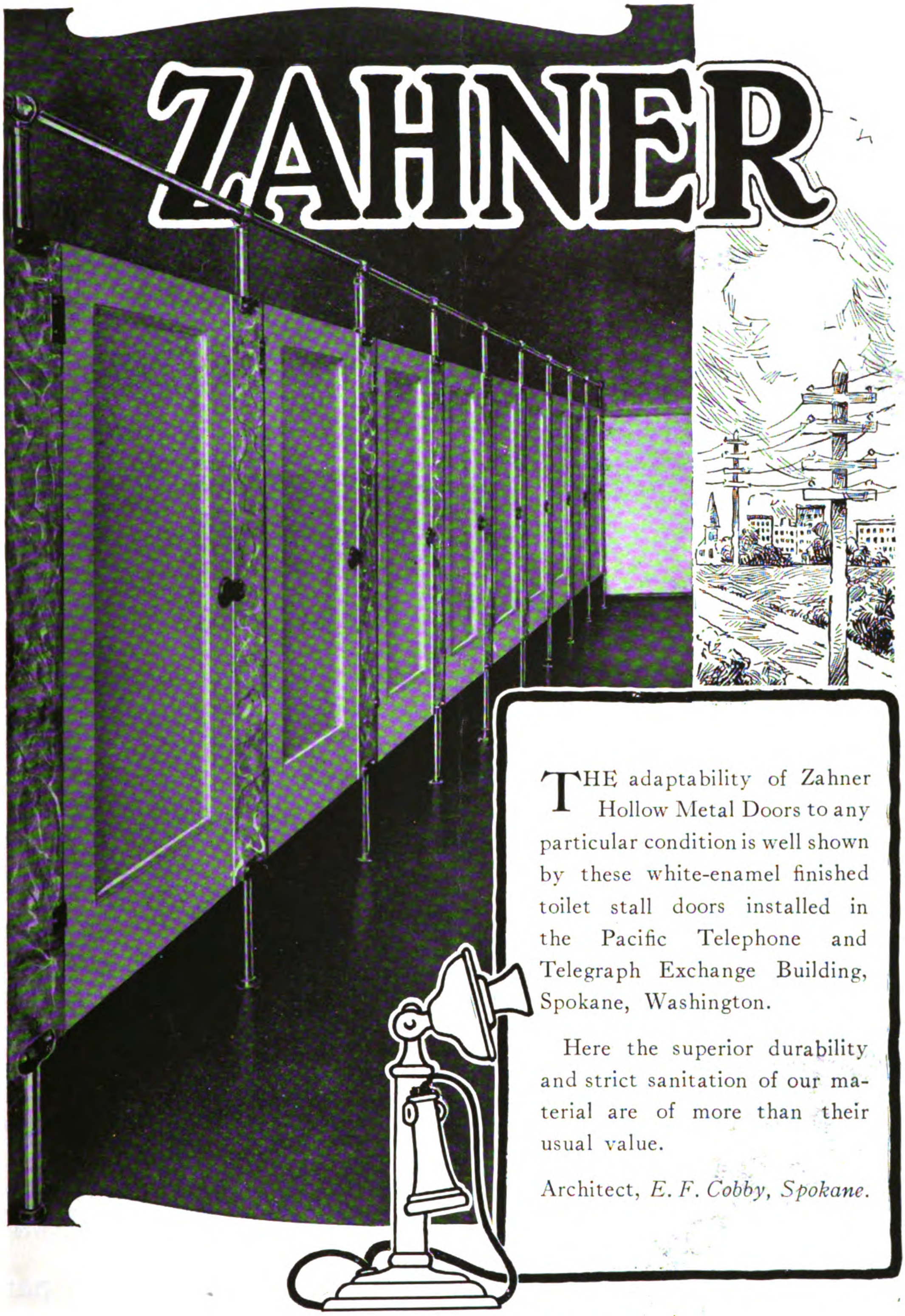
The janitor upon opening the door was surprised to find everything consumed. The wall tile showed effect of excessive heat. Draft in shaft intensified matters.

Quality as related to Dahlstrom Doors implies more than a good looking door of metal. Dahlstrom Quality is established on the basis of dependable service in the emergency of fire. Your responsibility ends with the installation.

*Write for **all** the facts.*

DAHLSTROM PATENT DOOR
ARTISTIC EVERLASTING
SANITARY AND FIREPROOF

**THE DAHLSTROM METALLIC DOOR CO.**
**Executive Office and Plant, 61 Blackstone Ave., Jamestown, N. Y.**
New York Office, 130 East 15th Street



THE adaptability of Zahner Hollow Metal Doors to any particular condition is well shown by these white-enamel finished toilet stall doors installed in the Pacific Telephone and Telegraph Exchange Building, Spokane, Washington.

Here the superior durability and strict sanitation of our material are of more than their usual value.

Architect, *E. F. Cobby, Spokane.*

**THE ZAHNER METAL SASH AND DOOR CO.**

**CANTON**
THE CITY OF DIVERSIFIED INDUSTRIES

***Branches in all Principal Cities***

***New York Office 42nd Street Building***

**Every Advertiser of Cement says:**

***"Concrete for Permanence"***

## Here is the "Concrete for Permanence" Roofing

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CONSTRVCTION
ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. IV FEBRUARY, 1917 No. 2

## *Jamestown's Proposed Building Code*

THE proposed building code for Jamestown, N. Y., which has been sent to the editor for comment and constructive criticism, is excellent, with but one important exception.

The Building Code recommended by the National Board of Fire Underwriters has quite properly been taken as a basis on which to write the proposed code for the city; and there is no marked deviation from this code until Section 80, Roof Coverings, is reached. Here in the second paragraph the National Board Code provides that all dwellings shall have a roof covering that is at least fire retardant. Jamestown, however, proposes to add:

"Provided that nothing herein contained shall be construed to prohibit the use of wooden shingles on dwellings and buildings not exceeding two stories or thirty feet in height and 2,500 square feet in area, and not used for factory, warehouse or other mercantile purpose."

To a great extent the insertion of this clause will defeat the purpose of the roof covering section. To admit the dangerous wood shingle anywhere within the city limits is but to make more severe the conflagration hazard, and in so doing the safety of the city is jeopardized.

In warning the officials of Jamestown in this matter of permitting the construction of paths along which a conflagration may travel, we desire to call their attention, and that of every person interested in the building code question, to the fact that many of our worst conflagrations were carried throughout the burned citie on the wood shingle roofs of "buildings not exceeding two stories in height or 2,500 square feet in area." Careful consideration should also be given to the cost question and a study of the figures on roofing costs at Rochester, given elsewhere in this issue, may prove enlightening on this point.

A fire-resistive or retardant roof covering, costs no more than a good wood shingle roof, and tends to eliminate the conflagration hazard. Again, there is the matter of insurance saving, which is made possible by the use of unburnable roofing.

Jamestown has in its power *now* to stamp out once and for always the conflagration breeding wood shingle. It is to be hoped that for the sake of public safety and modern progressiveness in the matter of conservation that Jamestown will heed the warning of the burned cities. It is a striking fact that, almost without exception, the *wood shingle is not allowed in cities which have already suffered conflagration losses.*

The city officials are to be congratulated on having the sense and foresight to use the National Board Code as a basis on which to develop that for their city. Whatever criticism has been offered is in a constructive nature only, and is based on a careful study of those conditions which have brought great loss to other cities.

It is to be realized that this is but the proposed code, and undoubtedly the section criticised will be given serious consideration and the dangerous elements eliminated.

If this is done, Jamestown will have a code which can well serve as a model for cities of like size, and the officials of that city can feel that their work has been well done and that they have set in motion forces which will protect their citizens from that menace to American cities, the conflagration!

## *Rochester Fighting Conflagration Hazard*

IT is interesting to note that the progressive city of Rochester, N. Y., is seriously considering the passage of an ordinance prohibiting the use of inflammable roofing, particularly the wood shingle type.

The Fire Prevention Committee of the Chamber of Commerce has taken up the matter of the proposed ordinance with that body and it is being decided by referendum vote. Previous to this, the matter was taken up with a number of local architects who voted strongly against the use of the wood shingle, realizing that this form of roof covering provides a severe conflagration hazard in the city.

Of particular interest was a cost test carried out to prove that the use of incombustible roof coverings would not increase the expense of building or recovering old roofs. A number of local roofing contractors were asked to bid on the roofing of a house selected for the purpose, and the contract was awarded to one of the competing bidders.

Following are the figures of signed bids which are in the office of the Chamber of Commerce:

| | |
|---|---|
| **Asbestos Shingles** | |
| Bid No. 1—(Gray—French style) | $455.70 |
| Bid No. 2—(Gray—French style) | 492.50 |
| Bid No. 3—(Gray—French style) | 493.00 |
| Bid No. 1—(Veneer Red—French style) | 499.20 |
| Bid No. 1—(Gray—American style) | 543.20 |
| Bid No. 1—(Black—American style) | 658.20 |
| **Slate** | |
| Bid No. 4—(Black) | 404.00 |
| Bid No. 3—(Black) | 545.00 |
| Bid No. 4—(Purple and Green) | 500.00 |
| **Cement Tile** | |
| Bid No. 5—(Red) | 395.00 |
| Bid No. 6—(Red) | 395.00 |
| **Asphalt Shingles** | |
| Bid No. 1—(Wide space—Red or Green) | 297.45 |
| **Asphalt Strip Shingles** | |
| Bid No. 1 | 326.45 |
| **Wood Shingles**<br>18-Inch Perfection | |
| Bid No. 1 | 497.00 |
| Bid No. 2 | 500.00 |
| 18-Inch Standard Stained | |
| Bid No. 2 | 573.00 |
| Bid No. 1 | 574.00 |
| 18-Inch Perfection Dipped with Cabot's Stain | |
| Bid No. 2 | 591.00 |
| Bid No. 2 | 618.00 |

It is to be hoped that Rochester will heed the warning of great conflagrations that have brought misfortune to sister cities, and, realizing the active part played by the wood shingle in these conflagrations, eliminate its use and force a gradual reduction of the dangerous roof areas which menace the safety of the city.

## The Trend of the Times

NOWHERE has the trend of the times toward fire elimination been more conclusively shown than in the report of Assistant United States Forester W. B. Greeley, on the lumber industry, made public in January.

This report shows that 8,000,000,000 feet of lumber have been lost to fire resistive structural materials during the past ten years. This represents twenty per cent of the present yearly cut. During a like period the home consumption per capita has shown a shrinkage of one-quarter of the current annual output of lumber.

When it is considered that this loss has been shown during a period of almost unprecedented business activity, accompanied by steadily increasing and, in many cases, record-breaking building operations the true significance of this report is realized.

Another startling statement in the Greeley report is that the high tide in the lumber trade was reached ten years ago, in 1916; since that time the consumption has every year shown a falling off from that year's volume.

While a part of this loss may be accounted for by the trend from country to urban residence, the actual percentage due to this cause is relatively small. Even in the country a steadily increasing number of buildings, particularly barns, silos and other out buildings are being erected of permanent materials. In the cities, a fair instance of the trend is given in Cleveland, where a gain of almost 100 per cent in the number of fire-safe homes was shown in 1916 over the year previous.

Probably the greatest gain, however, results from the fact of legislation which absolutely bars wood from fire districts and shingles from all roofs in the interest of fire elimination. These precautionary measures are on the increase in most all cities of any size, and indicate a real sentiment against flimsy construction and the conflagration, such as Hopewell, Augusta, Salem and Nashville, which it invites."

## Clear Duty of Municipal Officials

OF high interest to all citizens of this country, the article entitled, "Nation Pays High for Carelessness With Fires," prepared by W. E. Mallalieu, general manager of the National Board of Fire Underwriters, and printed elsewhere in this issue of CONSTRVCTION, should be read with especial concern by all municipal officials charged with the preparation or enforcement of local building ordinances.

Taking the figures furnished by the Actuarial Department of the National Board as his basis, Mr. Mallalieu sets forth in tabular form the chief causes of fire throughout the country during 1915, broadly grouping these into the two divisions of "Strictly Preventable Causes" and "Partly Preventable Causes," and making proper deductions therefrom.

It develops that an aggregate loss of $9,061,298—or 5 per cent of the total fire loss of 1915—was directly traceable to defective chimneys and flues. Commenting upon this, Mr. Mallalieu says:

"The combination of defective chimneys and shingle roofs is one of the most dangerous known to our civilization."

Here, then, is a matter strictly within the regulating power of municipal officers, and one which in the interest of their respective communities they should lose no time in attending to.

# Nation Pays High for Carelessness with Fire

## *First Authentic Survey of Fire Causes Ever Made Shows Definitely That a Large Part of National Fire Loss is Wholly Preventable*

By Wilbur E. Mallalieu,

*General Manager National Board of Fire Underwriters*

ECONOMISTS are wont to call attention to the constant financial loss due to American carelessness. Carelessness appears so tragically in the news columns through its toll of dead and injured that this fact has somewhat overshadowed its purely economic values, but it is coming to be realized that these values are of proportions almost inconceivable. Rarely, however, has this been illustrated so specifically as in the remarkable statistics on American fire causes, now for the first time made public through the actuarial bureau of the National Board of Fire Underwriters. Americans have long regarded fire as a species of necessary evil, and have prided themselves upon possessing the finest fire-fighting equipment of any country. This national complacency is dispelled with an abrupt shock when it is learned that, in spite of our superior fire departments, the per capita fire loss of the United States is many times as large as that of most foreign countries.

### *Results of an Extensive Survey*

A natural question immediately arises as to the reasons for this disquieting fact. The reasons, of course, are manifold, but there has been a growing suspicion for years on the part of those who have studied the subject that most of the reasons are far from being excuses. Exact knowledge, however, has been lacking heretofore, and it is because of this lack that the National Board of Fire Underwriters, after much discussion with the National Convention of Insurance Commissioners, and the Fire Marshals' Association of North America, undertook the gigantic work of analyzing nearly all of the 500,000 or more fires which annually occur in the United States in order to tabulate and interpret the information deducible therefrom. This effort has entailed such extraordinary labor that the figures for 1915 are only now available. The following table shows the classification by causes. In order to facilitate a study of the table these causes have been subdivided into those which are adjudged to be Strictly Preventable, those which are Partly Preventable, and those which are Unknown, but which may safely be regarded as largely preventable. Indeed, the word "Preventable' stands out over any consideration as being the first and most important lesson that the figures teach.

STRICTLY PREVENTABLE CAUSES

| | Amount. | | Per Cent. |
|---|---|---|---|
| Defective chimneys and flues | $9,061,298 | or | 5.9 |
| Fireworks, firecrackers, etc. | 260,520 | " | 0.2 |
| Gas, natural and artificial | 937,714 | " | 0.6 |
| Hot ashes and coals | 632,486 | " | 0.4 |
| Ignition of hot grease, oil, tar, wax, asphalt, etc. | 440,963 | " | 0.3 |
| Hot or molten metal | 116,906 | " | 0.1 |
| Matches | 4,329,596 | " | 2.8 |
| Open fires | 746,871 | " | 0.5 |
| Open lights | 1,182,059 | " | 0.7 |
| Petroleum and its products | 1,647,513 | " | 1.1 |
| Rubbish and litter | 619,259 | " | 0.4 |
| Smoking (cigars, cigarettes, pipes, etc.) | 4,505,963 | " | 3.0 |
| Steam and hot-water pipes | 297,011 | " | 0.2 |
| Stoves, furnaces, boilers and their pipes | 7,943,080 | " | 5.2 |
| Total | $32,720,239 | " | 21.4 |

PARTLY PREVENTABLE CAUSES

| | Amount. | | Per Cent. |
|---|---|---|---|
| Electricity | $11,142,559 | or | 7.3 |
| Explosions | 2,132,256 | " | 1.4 |
| Exposure | 18,683,925 | " | 12.2 |
| Incendiarism | 6,196,229 | " | 4.0 |
| Lightning | 4,698,125 | " | 3.1 |
| Miscel., cause known, but not classified | 3,127,328 | " | 2.0 |
| Sparks, from fires | 4,846,123 | " | 3.2 |
| Sparks, from machinery | 1,857,972 | " | 1.2 |
| Spontaneous combustion | 5,463,822 | " | 3.5 |
| Total | $58,148,339 | " | 37.9 |
| Unknown | 62,363,298 | " | 40.7 |
| Grand total | $153,231,876 | " | 40.7 |

### *Fire Causes Strictly Preventable*

Analyzing more closely, it may be noted that defective chimneys and flues, the third of the known causes in point of size, show a strange variation from 1.6 per cent in the District of Columbia to 24.7 per cent in New Mexico. Thus, in the District of Columbia, this cause was most negligible, while in New Mexico it was responsible for nearly one-quarter of the total fire loss. In the State of New York this cause is chargeable with 4.1 per cent. Fires of this nature are more frequent in winter than in summer, and, therefore, should logically show a larger proportion in Northern States than those of the South, but Vermont, with 6.6 per cent, and Alabama, with 6.8 per cent, are so nearly equal as to make this hypothesis difficult. It is probably nearer to the truth to regard the percentage as due in some measure to good construction, thorough inspection and careful occupancy. In almost every State this loss is far too great, and calls for diligent measures of protection. The combination of defective chimneys and shingle roofs is one of the most dangerous known to our civilization.

### *Losses Caused by Fireworks*

Next in order of presentation, although nearly the least of all in point of size, are fireworks, firecrackers, etc. This cause is a good example of what can be accomplished through proper education, for it is but a few years since the Fourth of July in the North and Christmas in the South were regarded with dread by fire departments. The movement for a "Safe and Sane Fourth" has been taken up with zeal by hundreds of communities, which are substituting patriotic exercises and wholesome sports for the indiscriminate use of powder, which was formerly deemed indispensable. Whatever may be the hardship to the feelings of Young America involved in this change, it is certainly productive of saving in life and property, not to speak of sundry fingers and toes, and a number of States now show a loss so small that it is figured at zero in counting first costs. It is interesting to note that the small State of New Hampshire tops the list with a loss of $59,713, or 4.9 per cent, from this cause. The next State in point of percentage is Arizona, with only .5 per cent, and the other States range downward. In thirty-one of the forty-eight States the percentage does not rise above .1 per cent. This is a remarkable improvement over former years, and yet its total of $260,520 fire loss for the United States is still too large by that exact figure, since every dollar of it may be classed as strictly preventable.

### *The Toll of Gas*

Considering the universality with which gas is used, the total of $937,714 is hardly a large one, although the best authorities consider that under proper conditions it might all be eliminated. The worst offender from this cause is West Virginia, with 3 per cent, and Utah, with but $10 loss for the entire year, makes the most favorable showing. Most of the States show a loss of less than 1 per cent, the largest figures generally being found where natural gas is a commodity. There are fewer open gas flames to-day than was the case in former years, and popular education has progressed somewhat, but there is still room for improvement to the extent of nearly a million dollars.

Fires started from hot ashes and coals are principally due to carelessness of the householder. They are generally the result of putting hot ashes containing live coals into wooden barrels or boxes. And even the Southern States show some damage from this bad habit. Wyoming, with its percentage loss of 1.9 per cent, has the highest percentage figure, although Minnesota, with $52,345, shows the largest amount of property consumed. By a strange coincidence, Idaho, adjoining Wyoming upon the north, has the most favorable record, and shows but .1 per cent of damage.

### *Some Strange Geographical Variations*

From ignition of hot grease, oil, tar, wax, asphalt, etc., the table shows losses of $440,963, but Ohio, with its large oil interests, suffered nearly one-quarter of this entire amount, the figure being $103,876, or 2.1 per cent. It is another strange coincidence that Oklahoma, with its very large oil interests, suffered to the extent of but $884, and is rated at 4.9 per cent, this figure being too small to recognize upon a percentage basis of one decimal place. New York's loss of $74,170, or 4 per cent, is chargeable rather to the size of its population and the extent of its manufacturing interests than to natural features.

For the most part the States show little damage from hot or molten metal, and a few of them have none at all. The total, however, reaches the sizable figure of $116,906. For some reason, Maine has the largest figure, with $22,080, with Massachusetts and Indiana next, each having something over $19,000 of loss. With the exception of Maine, all of the States are below 1.0 per cent.

### *The Most Prolific Source of Fires*

With matches we come upon a real fire cause of large proportions, and New York State alone suffered a loss of $867,728 from their misuse. This is a case of unadulterated public carelessness par excellence, as everyone who has eyes must realize. In only eight of the States does the percentage fall below 1.0 per cent. It may be interpolated that these figures are somewhat misleading, because many other instances are doubtless covered up under the heading of Unknown Fire Causes. Certainly most fires, whatever may be their direct cause, are indirectly traceable to matches, and these little articles of universal convenience are used by the average citizen with great disregard for their immense powers of destructiveness.

Of all of the States, Rhode Island, with 8.8 per cent, makes the worst showing, after which come Massachusetts, with 5.4 per cent; Illinois, with 4.7 per cent, and New York, with 4.3 per cent. Florida is credited with but 0.4 per cent, and has, therefore, the best apparent record.

The largest figure under "Open Fires" is that of Pennsylvania, $160,257, with New York, $95,005, second, and Georgia, $53,701, third. From the standpoint of percentage Missisippi, with 1.7 per cent, is slightly ahead of several other States, while Nevada and New Mexico have no fires whatever charged to this cause. The national total is nearly three-quarters of a million dollars.

Open lights are directly associated with carelessness in the home, and yet one State—Vermont—reports no fires from this cause, and in Wyoming the loss was but $85. On the other hand, New York had losses of $230,742 and Massachusetts of $180,529. Massachusetts and Ohio have the largest percentage, the figure being 1.9 per cent in each case.

### *Dangers That Lurk in Kerosene*

Under the heading Petroleum and Its Products, which means, of course, not only kerosene, but the ubiquitous and dangerous gasolene and other lesser products, such as lubricants, Delaware shows the largest percentage of loss, with 4.5 per cent, and South Dakota, with 2.7 per cent, comes next, although New York has the largest physical loss, its total being $234,633. Of all the States Alabama, with 0.3 per cent, has the smallest loss.

The value of "clean up" days on the part of the citizens and the periodical inspection by uniformed firemen under the direction of the chief of the Fire Department in our more progressive cities as an aid to fire prevention may be appreciated from the fact that the total losses of $618,259 are attributable to rubbish and litter. This gospel would seem to be most necessary in the District of Columbia, where the astonishing percentage of 10.6 per cent is recorded, as against no recorded fires from this cause in Arizona. Illinois's losses were the largest in property consumed, being $80,899, after which come Massachusetts, $53,507; Oregon, $51,893, and New York $44,609, in the order named. It is encouraging to note that only five States exceed 1.0 per cent of fires from this cause.

### *The Case Against the Smoker*

Most smokers would indignantly resent the charge that they are not "good citizens," but the burden of proof would seem to be on them in the light of figures which show a total fire loss of $4,505,963, attributable to their carelessness. Only one State falls below 1.0 per cent under this heading, and that is Arkansas, with 0.7 per cent. On the other hand, the figure rises to 18.0 per cent in Navada, or nearly one dollar in every five of the State's total loss. Nevada has the smallest population of any American State, and it is a coincidence that the smallest State in point of territory should be second in proportion of fire loss from smoking, Rhode Island's figure being 11.0 per cent. Idaho comes next, with 10.5 per cent, while New York, as is perhaps natural in consideration of its population, has the largest loss in dollars. New York's figure is $801,582 or one dollar in every twenty-five of its total fire loss.

It may be a surprise to some to find steam and hot water pipes figuring as a cause of fires, and yet insurance men have reason to so regard them. In New York State alone the year's loss from this cause was $95,005. The percentages run from 0.5 per cent in the case of New York to 0.0 per cent in several of the States.

Of all known fire causes that embracing stoves, furnaces, boilers and their pipes ranks fourth, and it is next to the largest of the strictly preventable causes. Idaho seems to be the worst offender in the matter of defective heaters, with 15.4 per cent, and South Dakota, with 11. 8 per cent, is second. New York again takes the lead with total losses of $869,475, and Illinois is a close second with $799,56. No State comes down to a fractional percentage, the smallest figure being that of Alabama, 2.4 per cent.

All of the above are ranked as Strictly Preventable Causes, some being due to habits of direct carelessness on the part of the public and others to a lack of the preliminary inspection which would reveal the danger point. Taken in the aggregate, they form a serious indictment of the characteristic national heedlessness.

The next nine causes cited in the table come under the heading of Partly Preventable, the degree of preventability varying somewhat with local conditions, but appreciably large in all cases.

With the single exception of "Exposure," which implies a multiplicity of primary causes, electricity is chargeable with greater damage than any other cause in the table, and of this damage it is undeniable that a large portion is due to carelessness in use or to lack of inspection. It is scarcely thirty years since electricity began to figure prominently as a fire cause. When electric lights first appeared it was supposed by underwriters that they would effect a reduction in the number of fires through their displacement of the known dangers of gas and kerosene. These optimists, however, were speedily disillusioned, since it became evident that electricity brought new and subtle dangers of its own. Fires from defective insulation, for example, often broke out in places difficult of access in walls and elsewhere. With electricity's extraordinary usefulness, its universal distribution and its numerous forms of application it practically has assumed first place as a cause of fire, and this in spite of the great progress in correcting many of the earlier defects in switches, wiring and apparatus.

### *Electric Irons a New Peril*

No one who recalls the Iroquois Theater horror can doubt the need for extraordinary care in handling this dangerous force, and yet an almost new item that is rapidly growing formidable bespeaks the greatest carelessness. This is the epidemic of fires from small electric home devices like smoothing irons and curling irons and the want of exercising the proper care in their use. Underwriters are genuinely alarmed at the frequency with which it appears that such irons have been left in circuit, with the current turned on, and forgotten by their users until they have become overheated and have set fire to their surroundings. This is already a serious peril to life and property, and one that is highly inexcusable.

Under electricity the largest total losses are those of California, which makes a showing of $1,035,405, or 14.2 per cent. This, however, is exceeded in percentage by Arizona, where 30.4 per cent of all fire loss was so caused, and by Montana, with figures of 19.2 per cent. Delaware makes the astonishingly low showing of 1.1 per cent, a figure that is not approached by any other State. The loss of New York is $933,413, or 4.7 per cent of the whole.

The extraordinary damage from recent explosions is, of course, not included in these figures, which are for the year 1915, but explosions in some form or other are a constant menace in every State. New York again has the largest total, with $312,871, but the percentage of Nevada, 7.8 per cent, is the highest, with Maine, 6.2 per cent, second, and New Mexico, 4.7 per cent, third. Georgia, with 0.2 per cent, seems to have been the safest in this regard.

### *Fires from Exposure*

Exposure fires are divided into two classes—external an internal. External exposure is that of one building to another; internal exposure is due to a fire starting in the stock or premises of one tenant and communicating to the premises of another tenant in the same building. All such fires are assigned to this cause, whether internal or external. These fires, of course, share the degree of preventability of the primary cause, and in addition to this are largely affected by such questions as fireproof roofing, fireproof construction, water supply, fire department efficiency, and various other elements that are strictly within human control. The fact that the city of Vienna, in Austria, is said never to have known a fire which spread beyond the building in which it originated is sufficient commentary upon the subject of preventability in exposure fires. There is hardly a small town in the United States which can match the record of this great city.

### *Exposure Fires in New York State*

New York State, naturally, has the largest total again—$2,861,090, or 14.3 per cent of the whole. Its percentage is exceeded by South Dakota, 28.6 per cent; New Hampshire, 22.6; and several others, while the best record is that of Wyoming, 6.4 per cent.

It was formerly supposed that more than 50 per cent of all fires were of incendiary origin, and it cannot be doubted that the percentage is much larger than the figures given here, since many of the "unknown" causes are doubtless due to crime. The known total of $6,196,229, however, is by no means negligible, and the National Board of Fire Underwriters, in connection with local authorities, is now engaged in organizing a great campaign in the United States. This despicable form of crime not only has been a cause of great property loss but has cost numberless lives. The District of Columbia shows the largest percentage of 17.1 per cent, which is greater than that reported in any of the States, but California's 12.2 per cent ranks next in proportion, and its $886,454 is far the largest total of loss, being nearly $300,000 greater than the figures for New York. Nevada reports only 0.6 per cent as due to this cause, the best showing of any State.

### *Lightning Loss Can Be Prevented*

A total of $4,698,125 loss due to lightning proves that all fires are not of human origin, but that the degree of preventability ranges high is true, nevertheless. Comparative statistics between rodded and unrodded risks show that only a trifle over 7 per cent of this large total damage was suffered by buildings having lightning rods. It is even more startling to discover that the State of Oklahoma sustained 31.3 per cent of its total fire damage from this single cause, a fact which is doubtless explained by the frequency with which large oil storage tanks are struck by lightning. As against this the States of Arizona, Nevada, Washington and the District of Columbia are rated as 0.0 per cent, their losses having been less than one-twentieth of 1 per cent.

Sparks from fires are another of the large items, with a total of $4,846,123. The lesson for fireproof construction is too obvious to require comment. Under this heading the worst showing is made by Mississippi, 10.7 per cent; with Arkansas, 9.9 per cent, second; Florida, 8.8 per cent, third, and Alabama, 8.7 per cent, fourth. The Southern States thus appear to have been the leading sufferers. In Arizona the percentage falls to .1 per cent, the best showing of any State.

The layman might hardly expect to find a total of $1,857,972 attributed to sparks from machinery, but this has proved a serious item in some localities, notably in Texas, where it caused damage of $262,477, or 4.5 per cent. North Dakota, with 5.4 per cent, records an even larger percentage, although smaller in actual money loss, while Arkansas, Delaware, Missouri, New Mexico and Utah are rated at 0.0 per cent.

### *Spontaneous Combustion Not a Myth*

Some people have supposed that spontaneous combustion is a myth, but there is nothing mythical about a fire loss of $5,463,822 in the United States in a single year. When it is estimated that this figure is 50 per cent preventable, it may be assumed that such an estimate is very conservative. The most frequent cause of spontaneous combustion is from allowing oily rags to be kept in wooden boxes or in contact with combustible material. Certain kinds of oil have a great tendency to produce flame upon the least opportunity. The public has been warned times without number of the danger of carelessness in this matter, but oily rags are so often found in every household, factory and business building that the proportion of careless individuals is able to cause severe losses. Massachusetts would seem to be the State of the most careless people from this standpoint, since it suffered nearly one-fifth of the total American loss, the exact figure being $1,067,224, or 11.3 per cent. Another New England State, Vermont, is second, with 9.6 per cent, while little Delaware does not report a single dollar of damage from spontaneous combustion.

### *Fire From Unknown Causes*

The third division is that of "Unknown Causes," and, for obvious reasons, this cannot be subdivided. Fires so frequently burn up the evidence of their origin that this division probably can never fail to be a large one, but it would seem that loose reporting must account for the fact that 62.2 per cent, or nearly two-thirds of the entire fire loss in New Jersey, has been designated as "Unknown" in origin. In contrast with this, South Dakota accounts for the origin of all but 17.2 per cent of its fires, and the average for the United States is 40.7 per cent. The total is $62,363,298. It cannot be doubted that a substantial proportion of this huge total might have been prevented.

After such an analytical study it is hardly necessary to call attention to the vast economic waste of fire and the shocking way in which such figures discredit our national housekeeping. With all due allowance for sub-standard fire departments and water supply systems here and there, the lesson is constantly borne in upon us that Americans are a nation of careless people who take unnecessary chances and disregard the simplest precautions. The presence of one careless individual in a community imperils his careful neighbors, if such there be. It probably is only by a systematic and patient educational campaign, extending over years, or generations if need be, that America can be weaned from this national failing.

GEOGRAPHICAL DISTRIBUTION OF FIRE LOSSES

| Strictly Preventable | | Partly Preventable | | Unknown—Probably Largely Preventable | |
|---|---|---|---|---|---|
| State | Per Cent | State | Per Cent | State | Per Cent |
| Nevada | 43.9 | Arizona | 61.8 | New Jersey | 62.2 |
| Idaho | 38.0 | Nebraska | 57.0 | North Carolina | 57.0 |
| Utah | 35.0 | Oklahoma | 55.7 | Wyoming | 56.9 |
| New Mexico | 34.1 | South Dakota | 54.2 | Maryland | 55.3 |
| Delaware | 34.0 | Arkansas | 53.2 | Virginia | 54.8 |
| Rhode Island | 33.9 | California | 51.5 | Florida | 51.4 |
| North Dakota | 33.2 | New Hampshire | 49.6 | Oregon | 49.1 |
| Connecticut | 32.3 | Vermont | 46.6 | Alabama | 48.6 |
| Maine | 31.1 | Iowa | 45.1 | South Carolina | 48.3 |
| Dist. of Columbia | 29.9 | Mississippi | 44.6 | Pennsylvania | 47.0 |
| West Virginia | 28.8 | Wisconsin | 43.4 | New York | 46.5 |
| South Dakota | 28.6 | Montana | 43.0 | Georgia | 46.5 |
| New Hampshire | 27.8 | Indiana | 42.1 | Texas | 45.4 |
| Massachusetts | 26.6 | West Virginia | 41.6 | Kansas | 45.1 |
| Iowa | 26.5 | North Dakota | 41.5 | Delaware | 44.5 |
| Ohio | 25.1 | Massachusetts | 41.2 | Louisiana | 43.0 |
| Minnesota | 25.0 | Ohio | 40.7 | Kentucky | 42.7 |
| Indiana | 24.8 | Utah | 40.0 | Washington | 42.0 |
| Wisconsin | 24.2 | Michigan | 39.6 | Missouri | 40.4 |
| Wyoming | 24.0 | Dist. of Columbia | 39.6 | Tennessee | 40.2 |
| Michigan | 23.9 | Illinois | 39.0 | Colorado | 39.1 |
| Tennessee | 23.9 | Missouri | 38.8 | Montana | 38.6 |
| Maryland | 23.8 | Texas | 38.6 | Minnesota | 38.3 |
| Colorado | 23.5 | Alabama | 38.4 | Mississippi | 38.1 |
| Illinois | 23.4 | Nevada | 37.9 | Illinois | 37.6 |
| New York | 21.7 | Connecticut | 37.9 | Maine | 37.3 |
| Kentucky | 20.9 | Kansas | 37.9 | Michigan | 36.5 |
| Washington | 20.9 | Colorado | 37.4 | New Mexico | 35.7 |
| Missouri | 20.8 | Washington | 37.1 | Ohio | 34.2 |
| Louisiana | 20.8 | Minnesota | 36.7 | Indiana | 33.1 |
| Vermont | 20.7 | Georgia | 36.6 | Vermont | 32.7 |
| Oregon | 19.3 | Kentucky | 36.4 | Wisconsin | 32.4 |
| South Carolina | 19.0 | Louisiana | 36.2 | Massachusetts | 32.2 |
| California | 18.7 | Tennessee | 35.9 | Rhode Island | 31.8 |
| Montana | 18.4 | Pennsylvania | 35.6 | Idaho | 30.7 |
| Arizona | 17.8 | Rhode Island | 34.3 | Arkansas | 30.6 |
| Pennsylvania | 17.4 | Florida | 34.1 | Dist. of Columbia | 30.5 |
| Mississippi | 17.3 | South Carolina | 32.7 | California | 29.8 |
| Kansas | 17.0 | New York | 31.8 | Connecticut | 29.8 |
| Georgia | 16.9 | Oregon | 31.6 | West Virginia | 29.6 |
| Nebraska | 16.6 | Maine | 31.6 | Iowa | 28.4 |
| Arkansas | 16.2 | Idaho | 31.3 | Oklahoma | 28.2 |
| Oklahoma | 16.1 | Virginia | 31.1 | Nebraska | 26.4 |
| Texas | 16.0 | North Carolina | 30.2 | North Dakota | 25.3 |
| New Jersey | 14.7 | New Mexico | 30.2 | Utah | 25.0 |
| Florida | 14.5 | New Jersey | 23.1 | New Hampshire | 22.6 |
| Virginia | 14.1 | Delaware | 21.5 | Arizona | 20.4 |
| Alabama | 13.0 | Maryland | 20.9 | Nevada | 18.2 |
| North Carolina | 12.8 | Wyoming | 19.1 | South Dakota | 17.2 |

* * *

## *Building Increase Expected*

"ALL branches of the building trades," says the Dow Service Daily Building Reports to-day, "expect building construction to be stimulated sharply as a result of developments in the political situation."

Continuing, the Dow Service says:

"This was evidenced last week by further tightening in building material quotations, including lumber and glass, and in a firming tendency in steel and hydrated lime. All metals, including copper, brass and galvanized material, were stiffer in tone as the week closed. These changes and tendencies reflected the basic character of the building material market in times of national stress.

"No department of the building material market last week showed a shrinkage. Common brick, which is the most susceptible to shrinkage, showed no change downward. Four more barges came in through Haverstraw in a special tow, and all the boats under signment moved to unloading docks. The total quantity of brick available in the market to-day is 7,200,000. Until the cold spell there was an improved unloading movement.

"Manufacturers' discounts remain unchanged, but owing to the shortage of natural gas, higher prices may be expected. Prices are firmer, tending upward.

"Contractors are being advised by the trade if possible to get their requirements under cover immediately. Manufacturers and jobbers are refusing to quote ahead, and Government business may take precedence over other shipments on the railroads, making the embargoes more tense than ever.

# Baltimore's System of Fire Prevention Inspection

By B. S. Mace

*Superintendent of Insurance, Baltimore and Ohio Railway Company*

THE system of Fire Prevention Inspection in Baltimore was inaugurated under authority of an ordinance known as No. 346, passed by the City Council and approved by the Mayor on October 2, 1913, by which the Chief Engineer of the Fire Department of the city, or his deputies, are authorized to enter and inspect all premises, buildings or structures within thhe limits of the City of Baltimore for the purpose of ascertaining the fire conditions in and around same and to provide regulations for the prevention of and protection against dangerous fire conditions when so found.

In order to carry out the provisions of the ordinance and to prevent confusion in the matter of inspections, the city is divided into districts according to the variout departmental quarters.

The captain and the lieutenant of each fire company make daily inspections of about two hours each in their territory, alternating one in the morning and the other taking the afternoon. This is done so that the officers of a company may familiarize themselves with conditions in their respective territories. These officers are provided with blank forms to fill in, giving the information required for the Fire Prevention Bureau, which forms are made out daily after each inspection and sent to the main headquarters, where they are reviewed by the Chief Engineer of the Fire Department, who in turn refers them to a special officer in charge of the Fire Prevention Bureau, who follows up each inspection report personally in order that there may be uniformity and no confusion in inspections or remedies suggested. After the officer in charge of the Fire Prevention Bureau makes an inspection he reports the facts to the Chief Engineer of the Fire Department of the conditions existing, making recommendations for the correction of same, which report is turned over to the Board of Fire Commissioners, who in turn send out notices to the tenants or owners of the properties, calling attention to violations of the law and specifying a time for compliance with the notice. The parties to whom the notices are sent have a period of three days in which to appeal to the Board of Fire Commissioners for a revocation of the notice, should they feel the conditions do not warrant it, and if no application is made for such appeal the officer in charge of the Inspection Bureau proceeds to see that the notices are complied with after the time limit given has expired. If the parties who have been notified of violations of the ordinance have not appealed to the Board of Fire Commissioners or made no attempt to carry out the recommendations on the notice, the officer in charge of the Inspection Bureau notifies the Chief Engineer of the Fire Department, who turns the matter over to the police magistrates of their respective police districts for legal action in the premises. The beneficial results obtained from the enforcement of the provisions of this ordinance is shown in the reduction in the number of fires and a corresponding decrease in the fire losses, as per table below:

| *Years* | *Fire Loss* |
|---|---|
| 1909 | $1,328,615.33 |
| 1910 | 792,942.13 |
| 1911 | 565,926.41 |
| 1912 | 1,042,741.15 |
| 1913 | 1,145,040.81 |
| 1914 | 752,632.26 |
| 1915 | 641,617.63 |
| 1916 (approximately) | 500,000.00 |

For a period of five years prior to the passage of the ordinance the aggregate losses were $975,053.00 per annum. Since the ordinance has been in effect, with one month of the year 1916 approximated, the average loss has been $631,416.00, or a reduction of $343,637.00, or 35 per cent per annum in fire losses.

That the citizens of Baltimore appreciate the efforts being made in this direction by the Fire Department of Baltimore is shown in the fact that in the total number of of inspections, approximately 41,800, made by the Department since the passage of the ordinance, there have not been over twenty-eight cases in which it was necessary to bring to the attention of the Grand Jury and ask for indictments.

In addition to the inspection work carried on by the Fire Department of the city, a number of the large corporations and firms having big aggregations of property and values maintain a separate and distinct organization to carry on this work on their own properties and act in conjunction with the city authorities.

### Safeguarding Railway Property

The Baltimore & Ohio Railroad Company, with which I am associated, organized a department of this character as far back as 1901 and keep and maintain fire companies at their large shops and terminals in the city at all times, providing quarters for the men in which to sleep at nights in order that they may be on hand when needed, and requiring daily inspections of the properties and corrections of conditions found lia-

(*Concluded on page 72*)

*Edited by*
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***A Department Devoted to the Use of***
**PORTLAND CEMENT**
***in Consistent Firesafe Construction***

***Special Inquiries regarding the use of cement will be fully answered and any desired information may be obtained by addressing the office of CONSTRUCTION or the Portland Cement Association***

# Why Build Fireproof?

THE erection of a new building for increased accommodations for a growing business, or to replace obsolete buildings, requires considerable thought and study on the part of the business man.

The building is part of the machinery for the proper operation of his business and must be carefully planned in order to justify the expense. For the planning a specialist is employed, assisted by the heads of departments in the establishment and by advice from men engaged in similar lines.

The materials of which the building will be constructed are not given the same consideration as the arrangement of the rooms and the dimensions of the floors. The materials are too often selected after a cursory inquiry into first cost and rates of insurance. The object of this article is to indicate lines of thought and assist an intending builder to arrive at a conclusion as to whether the building shall be fireproof or slow-burning.

Reinforced concrete buildings are classed by the underwriters as fireproof. In reinforced concrete, steel, which has a high strength in tension, is used wherever tension exists, and concrete, which has a high value in compression, is used wherever compression exists in the frame. Concrete exhibits high resistance to fire, and the steel is protected by that amount of concrete which experience shows is ample. These buildings have complete framework of reinforced concrete with reinforced concrete slabs for floors and roof. The walls are usually thin curtain walls carried on exterior spandrel beams, so the walls need be thick enough to carry only their own weight for the height of one story. The walls may be of concrete, brick tile or stone.

*First Cost.*—The first cost of a building naturally attracts inquiry. It represents an investment and part of the operating cost of a business is interest on the investment in the buildings. The business man wants to be shown that his fixed charges will be reasonably low.

Data is available for thousands of buildings. Careful study of the cost shows that the relative cost data of reinforced concrete and slow-burning construction is a question of efficiency and supply of materials.

Data may be shown which proves beyond question that slow-burning buildings cost from ten to thirty per cent more than reinforced concrete buildings. Data may be shown which proves beyond question that reinforced concrete buildings cost more than slow-burning buildings. Similarly, data may be shown which proves beyond question that there is to all intents and purposes no difference in cost.

Speaking in the most general way, the first cost of a reinforced concrete building is less than that of a slow-burning building when the spans are long and the loads are heavy.

When the floor load is about 150 pounds per square foot and the span does not exceed 18 feet, in a district where materials used in either type are readily available in quantity, there is so little difference in first cost that bids from a number of contractors overlap.

For light floor loads on short spans the slow-burning building may be, and usually is, cheaper. Given, however, a sudden growth in building, which brings in from other cities experienced concrete contractors, and even this field of relatively short span floors carrying light loads becomes debatable.

Costs of typical buildings used for manufacturing purposes are given in the bulletin, "Factories and Warehouses of Concrete," which is mailed free on request by the Portland Cement Association. Costs have not increased much within the last six years, for experience reduced costs of construction in about the ratio the war increased the general cost, due to raises in costs of materials and labor.

*Cost of Insurance.*—The rate fixed for insurance represents to the insurance man the lowest ratio he can establish between income and losses. He is concerned in having this ratio as low as possible consistent with profits. The insurance man must make a profit, but if it is too great, business men will carry their own insurance by establishing a special fund. To judge of the merits of a type of construction by comparing insurance costs is not advisable.

The insurance man is interested in having more fireproof buildings erected; but he cannot insure these buildings at a loss, neither can he make too much difference between first-, second- and third-class buildings. To do this would be to encourage blanket insurance such as that given by mutual companies, which companies insure only select risks. The stock insurance companies insure all kinds of buildings, regardless of the class of business they house, making the rates as nearly as may be commensurate with the risk.

Ninety per cent of all fires are caused by occupancy. Thirty per cent of all fires are caused by exposure, occupancy in the exposing risk being in many cases the cause of fire. When buildings have walls that will not burn, with all openings in the walls protected by approved fire shutters, and in addition, roofs that will not burn, with all roof openings protected with approved skylights, thirty per cent of all fires are guarded against.

The prevention of fires starting is guarded against by the fear of loss on the part of owners. To prevent fires from spreading, the insurance men ask that all interior openings be enclosed by fireproof or slow-burning partitions. That stair wells and elevator shafts be similarly enclosed. That there be a minimum of small spaces within which fires may be sheltered and grow. That at regular intervals fireproof, or fire-resisting partitions divide floors into areas of convenient size within which fires may be confined. These matters having been attended to and all possible credits allowed for the many items involved, the insurance rate for reinforced concrete buildings is from twenty to thirty per cent lower than for a slow-burning mill construction building, on the structure. The contents rate is from thirty to forty per cent lower for the reinforced concrete building.

The insurance rate on the contents is not increased if the structure is not insured. The rate is dependent upon the protection afforded the contents. A final great reduction is obtained by the installation of sprinklers, so that there is very little difference in the rate of a sprinklered reinforced concrete building and a sprinklered slow-burning mill construction building. This last item, the installation of sprinklers and the great reduction in rate thus obtained, is sufficient to convince the conservative, thoughtful investigator that the insurance rate should be considered of great importance in deciding upon the type or material for a new building.

The insurance man wishes to minimize losses by fire. Since ninety per cent of all fires are caused by occupancy, it is plain that fires may start just as readily in a fire-proof building as in a slow-burning building. Whatever will minimize the effect of the fire appeals to the insurance man. The value of the structure is often a bagatelle compared with the value of the contents, and the contents are often highly combustible. It is among the contents a fire starts, and not anywhere in the skeleton of the building, but the value of material is liberally recognized by all rating bureaus. The basis rate is affected also by the character of the business in the building and the number of employees. Statements as to relative difference between fireproof and slow-burning buildings can only be general.

The owner has other things to consider besides the ratio of losses to income, which looms so large in the mind of the insurance man. The owner pays insurance as an expense item to minimize fire losses. The money received from the insurance company partially reimburses him for the value of the goods destroyed and pays a part of the cost of the restoration of the building. It does not take care of other items which may be classed as follows:

1. Maximum fire protection.
2. Minimum disorganization of business resulting from fire.
3. Peace of mind.
4. Maximum freedom from vibration.

*Maximum Fire Protection.*—Insurance affords no protection against fire, but merely lessens the bad effects of a fire. The insurance rate is very materially reduced by making the structure as nearly fireproof as possible. A protection not recognized by the insurance rater is obtained by making all parts of the building of a material that will not rot or rust or become inferior with the passing of the years.

Reinforced concrete does not grow weaker with age. Experience apparently indicates that the material grows stronger and tougher with age in nearly every case. It is thus as safe against destruction by fire after many years as it is in the first year of existence.

Unfortunately, the same cannot be said of wood. The subject is one too long to discuss here, and the reader is referred to a pamphlet entitled "Dry Rot in Factory Timbers," issued by the Inspection Department, Associated Factory Mutual Fire Insurance Companies, 31 Milk Street, Boston, Mass., and sold for twenty-five cents, postpaid.

The maximum of fire protection is obtained by using reinforced concrete as compared with slow-burning construction. To be sure, wood may be treated to prevent dry rot, and it may also be treated so it will not burn. These treatments, however, so increase the cost that slow-burning construction loses the principal argument in its favor; that is, low first cost.

*Minimum Disorganization of Business Resulting from Fire.*—The best instance of the value of reinforced concrete in a fire is that in the plant of Thomas Edison, Inc. It is fully described in the bulletin entitled "Report of the Committee on the Edison Fire," which is mailed free on request by the Portland Cement Association. Mr. Edison, as a result of the fire, made the following statement:

"The millions of dollars of fire losses in this country annually make it a matter of moment that the superiority of reinforced concrete for fireproof structures should be thoroughly understood."

A statement by an official of the company was to the effect that "the salvage of machinery in the concrete buildings was 90 per cent; of the buildings, 87 per cent, and the cost for the restoration of these buildings was from 10 to 15 per cent of that for new buildings."

Several long, narrow buildings of reinforced concrete were occupied by a business in which materials of a most inflammable nature were employed. Adjoining buildings had brick walls with light iron roofing on steel trusses and heavy wooden floors carried on steel beams. These adjoining buildings were completely destroyed.

The concrete buildings had ordinary wooden and window frames, with wood sash and common glass. Floor openings were not protected. There were no fireproof partitions to divide the floors into small areas within which a fire might be confined. There were no sprinklers. Around one column was piled 25 tons of wax, which burned with so intense a heat as to melt some of the reinforcing.

The buildings were built a number of years before the design of reinforced concrete was standardized. The columns especially exhibited bad details. The buildings, however, when they cooled down were swept out and portions almost immediately occupied temporarily while repairs were made in other portions. Within a marvelously short time the buildings were restored, and when the restoration was completed they were better than ever. It is interesting to note that the salvage in the structures was claimed to be 87 per cent.

Every fire disorganizes a business to a greater or less extent. Not only are the owners affected by the loss of business during the period following the fire in which new stock must be bought and temporary arrangements is completed, but the employees are seriously affected.

The majority of employees will face without much anxiety the loss of a few days, or even a week or two, but the prospect of a long lay-off compels them to seek employment elsewhere. If the rebuilding takes a long time a new working force must be engaged, and this means a loss in efficiency while the new force is being co-ordinated. If the fire occurs in a reinforced concrete building it can be cleaned out as soon as the insurance adjusters permit and the regular employees may be given this work to hold them together. When cleaned out, all damaged woodwork can be quickly replaced and window openings may be closed temporarily with muslin in frames in order that work may be resumed pending the permanent repairs.

*Peace of Mind:*

A very severe fire, especially if the concrete is struck with cold water while hot, may cause a slight disintegration, less than an inch, as a rule, of the surfaces. If the pitting does not expose the steel so that the fire affects it, all the damage can easily be repaired with mortar and the appearance fully restored. The strength is not affected, for in designing a building the area of concrete outside the steel is not considered as adding strength. It is used merely for fire protection.

A severe fire in a slow-burning construction building will char the surfaces of columns, girders, beams and floors, and the depth of the charring is often considerable. Every square inch of area is considered in figuring the strength of wood, so a deep charring cuts down the strength. The appearance is permanently affected. To plaster the wood or to enclose it in any kind of boxing or protective covering will be apt to cause dry rot.

If a building is permanently weakened by fire the output is affected and it may be necessary to institute extensive repairs and reconstruction work to obtain the necessary strength. To use a building in which there lurks danger of partial or complete destruction by fire is not conducive to peace of mind. Buildings in which much wood is used grow weaker with age, and hence the carrying capacity is lowered day by day, so that failure may some time result unless floor loads are lessened to keep pace with lessening strength.

One slight indication of the effect of wood is shown by the way the fire insurance rate is affected by concrete buildings when wood is used for floors or trim. To use wood floors on top of concrete adds 10 or 15 cent per square foot to the cost, or practically 10 per cent to the cost of the structure. A credit of 5 per cent is given if metal trim is used instead of wood trim and a credit of 7 per cent is given if no wood floors are used. If 1/30 of the floor area is of wood and this 1/30 does not exceed a total of 600 square feet the same credit is given as though no wood were used. The absence, however, of wood or any material that will burn is conducive to peace of mind—something worth paying for.

*Maximum Freedom From Vibration:*

Vibration in a building is a disconcerting phenomena. It is absent in properly designed and constructed

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# Arguments Against Reinforced Concrete Buildings

*The Material a Substitute:*

A sentimental argument against concrete is that it is merely a substitute for materials long used by mankind. Reinforced concrete is not in any sense a substitute. It is a material which can be used wherever any other building material may be used. It is as strong as steel, but not so light when of equal strength. It is as strong as wood and more durable, being affected neither by fire nor decay. It may be used instead of brick, but is not a substitute, having equal claims for carrying power and durability.

*Lack of Permanence:*

Concrete is opposed on the grounds that it may be non-permanent and therefore an experimental material. It is urged that it will go to pieces and some day the collapse of concrete buildings through disintegration will cause great disaster. Quotations are made from articles written by advocates of concrete construction, which articles were written as warnings to guide contractors in the proper mixing and placing of concrete. Isolated sentences are used to show that concrete is dangerous, but it is well known that not all concrete is bad. Concrete structures erected twenty centuries ago, when cement was made in a hit-and-miss way, are in as good condition to-day as other structures of granite and marble in the same cities. The Portland cement made to-day is a superior article to the old Roman cement.

*Too Great Permanence:*

An argument against the construction of concrete buildings is that they are apt to last too long. If the occupancy of a district changes and all the buildings are discarded, the cost of destroying a concrete building will be considerable, therefore it is better to erect a building that will be ready for the scrap heap by the time it is no longer required for the use for which it was erected. This brings in the items of

Depreciation,
Repairs and maintenance,
Obsolescence.

*Depreciation:*

Depreciation is a physical wearing out, or permanent loss of value, due to deterioration of the materials of which a building is constructed, and the appurtenant parts.

Depreciation in a slow-burning construction building is usually assumed at 2 per cent per annum as a result of many years' experience. It is an accounting item to enable an amortization account to be estimated. It is quite likely that the amount may not be far wrong if the building becomes affected by dry rot. This question of depreciation is important in the settlement of damages by fire and an attempt is made to ascertain the actual value of the building at the time of the fire. In a slow-burning construction building only the walls are of any material other than wood.

Depreciation in a reinforced concrete building may be assumed to be one-half that in a slow-burning building. Fifty per cent, at least, of the building is of incombustible, non-decaying materials if the building is used exclusively for office purposes. A manufacturing building with maximum open areas and a minimum of wood floor and wood trim may have as much as 75 per cent of its value represented in incombustible, non-decaying materials.

*Repairs and Meintenance:*

Repairs and maintenance represent the expense required to keep up the efficiency of the building as a machine and to minimize depreciation. For buildings containing much wood the item of repairs and maintenance may be as high as 1 per cent per annum at first, this amount gradually increasing until the annual maintenance item is as great as the item for depreciation.

For reinforced concrete buildings the annual repair and maintenance charge is much less than for slow-burning construction buildings. A usual estimate is to assume them to be no more than two-thirds the percentage for the less durable building.

Assuming that depreciation for concrete buildings may be considered to be equal to that of slow-burning construction buildings and assuming also the item of repairs and maintenance to be equal to the same items for the slow-burning construction, they are, after all, essentially accounting devices to assist in obtaining the cost of conducting business and estimating proper returns. The knowledge that during the life of the building insurance against total loss by fire is given by concrete buildings is a comforting thing for the owner to ponder over.

*Obsolescence:*

Obsolescence is bulk depreciation. It is usually caused by a change of occupancy of a business district so that all buildings erected for special purposes are at once made of no value. The fact that business territories in American cities often shift suddenly is an argument brought against concrete buildings.

It is an argument favoring construction that is not durable, which means non-fireproof construction. It is therefore an argument to maintain, if possible, the present per capita annual fire loss in the United States. which is not far from $3, when by advocating fireproof durable buildings the annual cost can be reduced to the European record of 30 cents.

The fact that non-permanent buildings have been so common has had much to do with the sudden shifting of commercial districts in American cities. No person had a considerable investment and when the investment was finally written off, the worn-out structure could be abandoned without much regret. The cost of repairs and maintenance mounted so high in these districts of impermanent materials that neglect ensued. Insurance rates mounted rapidly because of the risks of exposure and also because the moral risk is high in a neglected and decaying neighborhood.

Property value kept rising in a district monopolized by certain industries until finally the prices became too high. Men hesitated to make a considerable investment in a district having a poor and neglected appearance in which insurance rates were high. The natural thing to do was to obtain options on lower-priced land and create a new district. There was a marked tendency a few years ago to design every building especially for the business to occupy it.

To-day the design of manufacturing buildings is pratically standardized. If a district is deserted by one line of business it can be occupied by another line with very little, if any, alteration of the buildings. This works towards the reduction of the item of obsolence.

The tendency to erect fireproof buildings will go far to stabilize sites for different kinds of business. Sudden shifting and practical abandonment of buildings will be less common when the buildings are of a permanent character. Though by the books the depreciation may be 100 per cent the building will actually exist and be practically as good as new. The fixed charges will be lowered by the disappearance of the item of depreciation. The item of repairs and maintenance will be relatively small. In the Edison buildings the salvage was declared to be 87 per cent, and this meant that the average cost for the complete renewal of all portions that could be destroyed amounted to only 13 per cent of the original cost.

The items of Depreciation, Repairs and Maintenance and Obsolescence may, however, be cheerfully regarded as items of no moment in making comparisons between reinforced concrete and slow-burning construction if there is no difference in first cost.

If a reinforced concrete building costs a trifle more, peace of mind is brought about by the fact that at all times during the life of the building there is maximum fire protection and certainty of minimum disorganization of business resulting from fire. The slight increased cost is, therefore, to be placed in a category with fire insurance and life insurance, both of which are devices intended to cultivate peace of mind.

## *Why Build Fireproof?*

(*Continued from page 69*)

reinforced buildings. This is a most important item to consider when machinery is to be installed.

Investigations into this very important matter have been made and the general opinion of manufacturers is that vibration is bad for machinery. A building should be rigid. Much apparent confusion exists in the minds of men who discuss vibration and rigidity.

Rigidity in every part of a building is necessary in order to prevent temporary displacements of machinery while in operation and to prevent heating or bearing of shafts. When there is a lack of rigidity there is more or less vibration in the vicinity of the non-rigid part. A lack of rigidity generally throughout a structure causes synchronous vibration, which affects every machine and often affects the nerves of the workers. If a rigid material causes breakage through impact a thin cushion may be introduced. In a concrete building a thin cushion may be put under every foot of every machine and the effect of impact is overcome. Advocates of elastic material for structures merely consider the impact effect of a rigid material without taking into consideration the vibration of the whole structure.

## *Pittsburgh's New Code Being Compiled*

IN view of the fact that Pittsburgh has been suffering from too large a volume of poor building and too little attention on the part of its building authorities to present building laws, the enacting of a new building code should be a blessing to the city. Architects and contractors would welcome a change in the Smoky City's construction methods.

The Code Commission has its hands full in trying to meet the approaches of the various firesafe material interests, between whom there exists a keen rivalry. Whether the new code, now being written, will favor concrete or brick and hollow tile is a matter still unknown.

## *Recognize Wood Shingle Roof Menace*

IN arguing before the Texas Fire Insurance Commission for authority to increase rates throughout the State, counsel for the underwriters laid particular stress upon the menace of wood shingle roofs, one of the most prolific causes of fire, and a hazard that is still tolerated to an unusual degree in the Lone Star State.

Insurance men cannot be accused of being opposed to wooden roofs upon sentimental grounds, their attitude being induced solely by virtue of the disastrous experience had with this form of building material.

## Forces in Fire Prevention

ADDRESSING members of the Fire Insurance Society of Philadelphia recently upon "The Forces in Fire Prevention," Franklin H. Wentworth, Secretary of the National Fire Protection Association, discussed the social aspects of expert service, referring to the work of underwriters' laboratories for illustration. "The laboratories," he said, "brings to every city official who has to do with fire protection dependable knowledge that the cards he holds in his game of administration are not marked. The official who nowadays must determine by his own investigations the integrity of the cards he plays with is a survival of the old days of incompetent administration. It is this handicap, this attempt to perform two separate functions, that has discredited and dragged down many capable and talented public executives; and the public reaction against this unavoidable incompetence has found expression during the past decade in the demand for administration by experts. The public jumped out of the frying pan into the fire.

"As a general proposition an administration by experts is a failure; it lacks vision, it lacks balance, it lacks humanity. Capable administrators are impatient of details; they are men who see things in large dimensions and see things in relation to other things. They desire facts, but not to dig them out, nor to conduct experiments to verify them; that is the work of the expert. With reliable facts once in hand the administrator may formulate his policies and dramatize expert knowledge in political action. The Fire Commissioners of the country may now rely upon the underwriters' laboratories for that information regarding fire appliances and materials which was previously sought in each city through local means. For this purpose the local equipment was always inadequate, and the administrative function confused and harassed by limited experience which might be misled by private interests. In addition to his big job the Fire Commissioner had also to administer the job of watching the production of his expert facts, and the surer he was of the one the less energy he had for the other. The immense social service of the underwriters' laboratories thus appears not only in saving the cities the expense of operating individual testing stations, each duplicating the work of the other and differing according to its incompetence, but it releases the executives from a responsibility for items which cannot be successfully determined by local experience, or when once determined cannot be depended upon to remain so.

*Inspection of Factories.*

"No single examination of a device is sufficient, and regular factory inspection service cannot be carried on in one city by the city officials of another. Hence the great social value of an institution which is able to furnish without charge to the public engineering opinions based upon a country-wide and long-continued general experience, and whose constantly maintained factory inspection service insures a continuance of reliability in factory output of the appliances originally approved. Without this feature the approval of an appliance may react at any time as an embarrassment to the endorser."

Mr. Wentworth also spoke in high praise of the recently inaugurated plan of the National Board of Fire Underwriters to supply the press of the various States local items and statistics on the fire waste furnished by its new actuarial bureau. "By this means," he said, "the National Board can add another contribution of actual service to its long record of generous financial assistance to our cause. We have never before possessed the equipment for producing local statistics of fire causes and fire losses calculated to impress individual States and municipalities with their culpability, and which may be used in making effective comparisons of the fire loss conditions of one State with another."

## Baltimore's System of Fire Prevention

(*Continued from page 66*)

ble to cause fires. We have a system of watchman service both day and night with 200 combination watch and fire signal boxes, reporting direct to a central office, which in turn reports direct to the Fire Department of the city. We also have in operation an up-to-date fireproof detached pump-house with sufficient pump capacity, taking supply from the harbor, and a system of fire lines and hydrants and hose houses with sufficient hose to take care of our needs in case of fire. The fact of our having spent over $100,000.00 in the last five years on Fire Prevention alone in this city is evidence of what this one corporation is doing along the lines of this particular work in Baltimore. Our motto is: PREVENT FIRE LOSSES—STUDY THE CAUSES.

## Improvement in St. Paul's Fire Protection Needed

ALARMED over the threatened increase in fire insurance rates in their city, the business men of St. Paul, Minn., are agitating for improved fire-fighting facilities. A special committee of the Association of Commerce, recently appointed to study the general subject, asserts that the situation is serious, and recommends that from $200,000 to $300,000 be expended in the near future for additional and modern fire-fighting equipment if the city is to maintain its present insurance rating classification.

**Edited by**
**SAMUEL GEORGE WEBB**
**Secretary**
**Gypsum Industries Association**

**A Department Devoted to the Use of**
**GYPSUM**
**In Consistent Firesafe Construction**

***Special inquiries regarding the use of Gypsum will be fully answered and any desired information may be obtained by addressing the Office of Construction***

# Gypsum: Stability, Non-Conductivity and Non-Corrosive Qualities

IN the previous numbers we have reviewed some of the physical characteristics of gypsum under the influence of heat and water. We have shown that gypsum possesses in high degree the qualities of:

*Low conductivity of heat.*
*High resistance to heat.*
*Power of resisting impact of water when uncalcined.*

There are still three characteristics which are important to consider in connection with the use of gypsum for structural purposes before passing on to describe the various structural uses to which gypsum is put. These are as follows:

*Power to resist shock, or stability.*
*Non-conductivity of sound.*
*Stability and resistance to shocks.*

Let us consider the first of the qualifications, viz., resistance to impact of falling bodies, or power to resist shocks; or in other words, stability.

### Stability of Gypsum

It may appear paradoxical to say that gypsum structures, such as partition walls, floors and roofs, possess the power of resisting shocks when it is considered that such forms of structural gypsum are, compared with some of the harder building materials, soft and porous in structure and of a more or less loose, chalky character.

It is this very absence of hardness in the form of brittleness, such as is possessed in varying degrees by clay and kaolin products, that avoids a shattering when gypsum structures receive blows.

The result of shocks or blows on gypsum structures is invariably a local bruising or breaking of the material actually struck and, owing to the looseness of the structure of the surrounding material, the effect of such blows is not communicated to the surrounding mass, as it would be in harder, brittle materials.

A test to demonstrate this characteristic is very simple and can readily be arranged for by hanging a round metal weight, say twelve inches, from, and in front of, a gypsum block wall and then drawing the weight back and allowing it to swing in its arc so as to strike the wall in one spot repeatedly. It will be found that the only effect on the wall is a local bruising at the point where the weight delivers its blows. It is easy to measure the foot pounds delivered in such a test, and by repeating the same test with the same number of blows on walls of other structures a comparison may be readily established.

It is, of course, assumed that such a wall is properly designed as to height and thickness and properly laid in well bedded mortar joints.

### An Interesting Stability Test

Time tests have been conducted to secure information regarding the stability of gypsum block walls under long-continued usage, coupled with the continual slamming of heavy steel doors. Such a test the writer has in mind, which has been going on for six years or more, conducted on a two-inch solid gypsum wall. This wall was erected eleven feet in height, fifteen feet and six inches in length, with a heavy metal door hung in a metal frame placed in the center of the length. This wall was not tied into the ceiling, floor or walls, but merely wedged against the ceiling and set on a course of bricks on the floor and butted against the brick wall with a right angle turn at the other end of the length. This return length rested against another brick wall, against which it was merely butted. The wall was plastered with gypsum plaster on both sides, making a total thickness of three inches of finished wall.

The result of this test, as shown by latest observations, indicates that the wall has remarkable stability to withstand such continued hard usage.

Other tests, of loading, with excessive weights, floor panels of gypsum-poured construction, namely Metropolitan System, have shown that such structures have sufficient elasticity to withstand deflection, due to the loading, and then practically resume their normal shapes after the loads are removed.

Such a test was conducted for the City of Philadelphia on May 29, 1912, at Chester, Pa. The panel tested was six feet on centers and the slab was four inches in thickness, reinforced with wire cables spaced one and a half inches apart.

### *1190 Pounds per sq. Foot*

The panel was loaded with 13,092 pounds of pig iron over an area of eleven square feet, none of which weight rested on the I-beams or nearer than ¾ inch, from the flanges. This weight represented 1,190 pounds per square foot, at which time the deflection in the center of the span was one-half inch. Under this load no cracks were visible on the underside or upper side of the panel.

Many tests have been conducted on similar panels of floors, all of which show the remarkable flexibility of the material. In all such tests the panels resumed practically their normal shape after the loads were removed.

*Sound Conductivity*:

Reference has been made in earlier articles to the low conductivity of sound through gypsum materials. This quality is to be expected from the comparative looseness or lack of density of the material and the fact that it contains a multitude of extremely small air cells. Such a structure obviously possesses the characteristics of material that would not readily communicate the sound waves into and through itself because of its lack of density, and for the further reason that it actually breaks up the sound waves.

### *Sound Conductivity or Defection?*

The questions of sound conductivity and sound deflection are frequently confused and confounded. It is easily possible to have a wall of material which is non-conducting of sound, and to surface such a wall with a dense, hard material that will deflect the sound waves.

The New England Conservatory of Boston is an excellent example of this condition. In the design of this building great care was given to secure a design of partition so as to secure the greatest efficiency in non-conductivitv of sound between classrooms. These walls were built of double thickness of four-inch hollow gypsum blocks, with a one-inch air space between, in which was hung a sheet of seaweed quilt. Although tests prior to the building of the Conservatory had shown that such a construction would give the most efficient results in preventing the passage of sound through such walls, yet when the building was put into service trouble was experienced with the "noisiness" of the classrooms. Investigation, however, of this condition resulted in the opinion being reached that the "noisiness" of the rooms was due to the sounds which originated in the same room being deflected from its hard surfaced walls. Draperies were hung at windows, tapestries on wall and rugs were placed on floors to overcome this deflection of sound, with the result that the conditions were corrected. Subsequent investigations disclosed the fact that there was so little sound communicated through the walls that this building is now regarded as a model and example for the correct construction of musical conservatory buildings.

### *Investigating Sound Conductivity*

The subject of sound conductivity and absorption has been receiving more and more attention in recent years. Such institutions as Lewis Institute of Chicago, Carnegie Institute in Pittsburgh and Harvard University, have been investigating this subject, which is one of the most delicate and difficult of investigation.

Enough information, however, has been secured to substantiate the belief that gypsum materials are in high degree non-conductors of sound.

*Corrosion*:

Still another question that should be included under the heading of physical characteristics is that of corrosion of imbedded steel in gypsum materials.

This subject is becoming more and more interesting as the structural field for which gypsum is being designed becomes wider and wider and requires the employment of steel reinforcement.

Fortunately, we have the test of time to guide us and give us reliable information on this subject. Results that are coming to the notice of investigators from time to time, especially in the more recent years, are fast dispelling, if they have not already dispelled, the empirical assumption that because gypsum is a sulphate of lime, therefore, necessarily, there must be corrosion from the acid component of the neutral sulphate of lime salt.

### *A 15 Year Corrosion Test*

Steel imbedded in gypsum floors for fifteen years or more has recently been uncovered and shows that there is no corrosion beyond the initial corrosion, and that this initial corrosion has not progressed. It has become established in the minds of investigators who have given this subject careful attention that steel completely imbedded in gypsum is actually protected against corrosion and that the only way that corrosion can occur to such steel s iwhen dampness and air have access to it. It has been shown conclusively that gypsum of sufficient thickness completely excludes air, and if the structure is kept dry, as is the case with practically all interior construction, such as walls and floors, there is no possibility of the steel being affected by corrosion.

In this and previous articles we have reviewed the essential physical characteristics of gypsum that make it suitable and valuable as a structural material in modern buildings of the best type.

*A Department Devoted to the Use of*

**AUTOMATIC SPRINKLERS**

*Edited*

**IRA G. HOAGLAND, Secretary** **PAUL MASON, Special Representative**

*National Automatic Sprinkler Association*

# Attitude of Fire Chiefs Toward Automatic Sprinklers

THAT the old-time attitude of American fire chiefs toward the automatic sprinkler as a fire-fighting agency is suffering radical modification is demonstrated by the experience of a committee which made its first report at the 1916 convention of the International Association of Fire Engineers.

The chairman of this committee, whose labors are by no means completed, is Chief Howard L. Stanton of Norwich, Conn. The fire chiefs' committee, of which Chief Stanton is the head, was appointed at the Cincinnati convention of 1915, following the delivery and discussion of a number of interesting papers on the general subject of the attitude of fire chiefs toward the use of the automatic sprinkler. The committee was appointed "to investigate ways and means whereby automatic sprinkler systems may be used to best advantage by fire departments as fire defense auxiliaries," this action being taken in compliance with one of the provisions of a resolution unanimously adopted endorsing the automatic sprinkler as "an important means of controlling conflagration conditions and modifying responsibilities of fire departments, also as a most valuable auxiliary in fire department operations."

As preliminary to the handling of this big subject by his committee, Chief Stanton determined to ascertain from the fire chiefs of the cities what practices are followed by them in fighting fires in buildings equipped with automatic sprinklers. Six hundred fire chiefs subsequently received a question blank.

The time was insufficient for a thorough canvass, but up to the date of the August, 1916, fire chiefs' convention at Providence, more than 100 chiefs had returned the question blank, and 95 of these were quite complete. It was not possible for Chief Stanton to completely analyze the results before being called upon to present his report. The 95 reports were from cities having a total of 10,303 sprinkler equipments.

Responses to questions numbered 1 to 4, relating to fire department connections to sprinkler systems, and 5 to 9 relating to fire department procedure at fires in buildings equipped with sprinklers, were hurriedly analyzed, and presented to the meeting as follows:

Question 1. Are sprinkler systems provided with fire department connections—one-way or two-way (Siamese) couplings—for attachment of hose to supply water to systems?

Answers. Eighty-five per cent of the responses to this question report that sprinkler systems are provided with fire department connections. About 10 per cent of these reported only a few connections.

Question 2. Do you attach hose to fire department connections of sprinkler systems when responding to alarms of fire in sprinklered buildings?

Answers. Seventy per cent report they do, and 30 per cent they do not.

Of those who do, nearly one-half make a practice of connecting promptly, and the remainder connect at will. Most of the latter say they connect "if necessary," some "at the discretion of the commanding officer," and others under various conditions. One connects only with sprinkler system in high buildings; another, to systems that have no tank supply.

Chief Delfs (Lansing, Michigan) says: "Not always, but it should be done at all times, in my opinion." Chief Rozetta (Nashville, Tenn.) says: "I do, if conditions seem to justify it. Usually the fire is controlled by the sprinklers when the department arrives." Those who do not connect, tell why in response to question No. 4.

Question 3. If you attach hose to fire department connections, will you please explain what method you follow, whether first or second crew responding couples up, etc.; also what orders are in effect and all other details about how you use fire department connections of sprinkler systems?

Answers. Sixty per cent of those who attach to connections follow a method. Forty-three per cent of these report that the first company responding couples up with steamer connections; fifty-two the second company, and the remainder the second-alarm companies. Among the larger cities that have a method of using steamer connections are: Binghamton, Buffalo, Chicago, Detroit, Milwaukee and St. Louis.

Of the reports that first companies connect, about one-third say that the first lines stretched are connected; one-third, the second lines, and the other third do not specify which. Only two report actual orders in effect, Chicago and Milwaukee.

### *Rule of Chicago Department*

The Chicago Fire Department rule is as follows:

"Whenever a fire occurs in a sprinklered building the commanding officer of the first engine company arriving shall immediately connect his second line into the sprinkler system and charge the same."

Milwaukee's rule is the same.

Chief Broderick of Detroit advocates attachment of first lines. He says: "The first company to arrive connects the first line to the sprinkler connection and starts pumping if necessary. Then they stretch the second line and act as conditions require. If the fire seems to be gaining headway, we connect a line from another engine. When you connect a line to a sprinkler system you can use the men for something else."

Three report that pumping is begun as soon as connections are made, and seven that pumping is not started until orders are given.

Among the larger cities that do not have a definite method of using steamer connections are Baltimore, Boston, Pittsburgh, Newark, and Rochester.

Chief Johnson of Bridgeport, Conn., who reports that connections would be made "where overhead-tanks are not in use," says: "There are no rules at present but some such rules under consideration."

Question 4. If you do not attach hose to fire department connections of sprinkler systems, will you please explain why you do not?

Answers. Nine respond they do not, because they consider the public water pressure sufficient. Other reasons why connections are not made are classified as follows:

No connections, 6.

Very few connections, 2.

City water tank pressure sufficient, also tank supply, 4.

Sprinklers usually control fire, 3.

Never found it necessary, 3.

If more water necessary, use hose, 3.

Tank supply considered sufficient, 2.

Two water systems, high and low service, 1.

City water pressure sufficient, except in high buildings, 1.

Systems supplied by city water and private pumps, 1.

Except when water is shut off from street mains, 1.

If fire can be reached with chemical lines, 1.

Except when fire gets beyond sprinklers, 1.

Seldom need more water, 1.

Hose streams worth more, 1.

No pumping apparatus, 1.

Question 5. What practice do you follow in handling fires in sprinklered risks?

Answers. Only 50 per cent of responses report that a practice is followed, but this number represents 75 per cent of all the sprinklered buildings in the jurisdiction of the chiefs who have responded thus far to the questions. The smaller cities make an excellent showing in the responses to this question. The practices followed are, briefly, as follows:

Minneapolis, Minn.: "First company stretches line to fire; if controlled, sprinklers shut off."

Salt Lake City, Utah: "Locate fire; if sprinklers cannot control, have hose lines ready."

Lexington, Ky.: "Depend on sprinklers to control fire, but apparatus held ready to take hold if necessary."

Rockford, Ill.: "Let sprinklers do it if possible; if they cannot, help out with hose streams."

Wakefield, Mass.: "Make sure sprinklers are controlling or have controlled fire. Avoid, if possible, use of large streams inside buildings. Station man at valve to shut off."

Austin, Texas: "Lay hose, but do not use unless required or unless water from sprinklers is more than required to extinguish remaining fire."

Lynn, Mass.: "Station men to shut off when ordered. When fire is located and under control, water ordered shut off and floors swept."

Wheeling, W. Va.: "If fire not checked, department assists in extinguishing it. If under control, water shut off and drained, and goods overhauled."

Louisville, Ky.: "Experience has been that before arrival, fire was under control or out, and water was ordered to be shut off."

Seattle, Wash.: "Department always found fire under control."

Grand Rapids, Mich.: "Immediately determine amount of fire; stop flow of water as soon as practical. In the majority of cases fire is extinguished by sprinklers or can be handled by chemical streams."

Augusta, Ga.: "First-line crew locates fire, separates goods, and shuts off sprinklers, if fire covers small area; lines with shut-off nozzles stretched to be ready to prevent spread of fire. Water shut off as soon as possible, floors mopped and water scooped up to prevent seeping through floors."

Albany, N. Y.: "Shut off sprinklers when fire controlled, and use water or chemicals if necessary."

Albany, Ga.: "Station man to shut off promptly, if fire controlled or can be controlled by chemicals."

Hamilton, Ont.: "If fire is controlled, shut off and use water or chemicals; if not controlled and too many heads open to weaken pressure, use both hose and sprinklers until fire is controlled before shutting off sprinklers."

Detroit, Mich.: "If fire under control shut off sprinklers and extinguish remainder as thought best."

Milwaukee, Wis.: "When fire controlled, shut off and drain sprinklers and put out balance of fire with such equipment as may be necessary."

Cohoes, N. Y.: "As soon as fire is *located* sprinklers shut off and water or chemicals used."

Bristol, Pa.: "Keep sprinklers on until our lines are laid."

Lebanon, N. H.: "Sprinklers shut off if we cannot see any flames."

Newark, N. J.: "Stretch lines and go to work."

Holyoke, Mass.: "Same as at any fire. If delayed in shutting off sprinklers, use brooms to remove water."

Kokomo, Ind.: "We work in conjunction with sprinkler system."

The foregoing comments are not all that have been received; they summarize the practices followed.

Question 6. Do you require that water shall not be shut off from sprinkler heads until it has been definitely found out that the fire is under control?

Answers. Eighty per cent do, 14 per cent do not, and 6 per cent non-committal.

Chief Bywater, Salt Lake City, says: "Do not allow any shut-off until officer has made a thorough investigation and is satisfied that the fire is out."

Chief Boughner of Grand Rapids says: "We take no chances. It would certainly be a fatal mistake to do otherwise."

Question 7. Do your men shut off the water when fires are controlled?

Answers. Ninety per cent of responses report that fire departments do this, and 10 per cent that they do not.

Of those that do, four direct salvage corps do it, and eight instruct building employees.

Chief Boughner says the reason his men shut off sprinklers is because "watchmen as a rule understand very little about sprinkler systems."

Chief Nissen of Winston-Salem, N. C., says his men shut off "if it is necessary to do so before arrival of man in charge of system, who is always sent for, as he is more familiar with valves."

Question 8. Do you require that sprinkler systems be put in commission, fused heads replaced, water turned on, before all firemen return to quarters?

Answers. Seventy-three percent do, and 27 per cent do not. Of those who do, eight direct salvage corps to do it, and two a building employee.

Chief Hederman of Hornell, N. Y., says: "Yes, by all means, to avoid a possibility of fire re-kindling."

Chief Chase, Miami, Fla., says: "Yes, by all means. And if there are not any new heads to be found we leave a hose company at the building until new heads are put in and the water turned on."

Responses from a few cities, where it is not required that sprinkler systems be put in commission before returning to quarters, follow:

Baltimore: "No; but it should be done, if possible."

Portland, Ore.: "No; we notify owner."

Columbus, Ga.: "Haven't done so, but such should be the case."

Wheeling, W. Va.: "The system is turned over to a watchman, who is responsible after we leave."

Appleton, Wis.: "No; but I advise putting systems in working order as soon as possible."

Rome, N. Y.: "A man detailed to remain at the building until the water is turned on."

London, Ont.: "That is up to owners. At night they are notified by 'phone from headquarters."

Chicago Heights, Ill.: "We have never required it, but it is obviously a good provision."

Question 9. Do you men replace fused sprinklers with new heads and turn on water?

Answers. Fifty-eight per cent say that their men do, and the rest that their men do not.

Of those whose men do replace fused sprinklers, seven co-operate with salvage corps, twenty with building employees, and two with insurance inspectors. Three report that apparatus carries extra sprinkler heads.

Of those whose men do not replace sprinklers, the following say:

Chief Hurley, Holyoke, Mass.: "We have never done so, but would be willing to do it."

Chief Rose, Wheeling, W. Va.: "I approve of doing so."

In his report Chief Stanton draws the following conclusions from the replies received:

### *Conclusions Drawn from Replies*

That for the most part sprinkler systems have fire department and steamer connections.

That only two cities heard from thus far—Chicago and Milwaukee—actually have a rule concerning the use of sprinkler system fire department connections.

That there is a sentiment in favor of a rule governing the fire department use of these connections.

That while in the jurisdictions of the 37 per cent who do not use connections are only 17 per cent of the total number of sprinklered buildings reported (most of them have less than 50 systems each), it is important that this minority give consideration to the practices of the majority who use these connections.

That while the majority of responses received report it is required that water shall not be shut off from sprinkler heads until it has been definitely found out that the fire is under control, 18 per cent, in whose territories are 16 per cent of the sprinklered buildings, report to the contrary, and these few might well give ear to what Chief Boughner of Grand Rapids said: "We take no chances. It would certainly be a fatal mistake to do otherwise."

## *Homes for the Industrial Class*

APPRECIATING the need for better home conditions among industrial workers, the Homestead Commission of Massachusetts is carefully studying the broad problem and suggesting methods for its solution.

The conclusion of the Commission is that "homesteads, or small houses and plots of ground," are needed. "The five-room house, comprising kitchen, living room, a bedroom for the parents, one for the boys and one for the girls, seems to be the minimum of accommodation for a growing family. Garden plots should differ in size and should be graded from the smallest, possibly 1,000 or 2,000 square feet for vegetables only, up to little farms of from 1 to 5 acres, so that it may be learned how nearly a family can support itself on such a tract of ground.

### *Cost of Proposed Homes*

The outside cost of these homesteads, in the view of the Commission, "should not exceed $2,000. This low figure would be very difficult to reach, but the means of the class whose needs ought to be met will not afford a higher." These people are receiving from $7 to $14 per week in wages, and are paying from $7 to $14 per month for rent. Fifteen dollars per month on a $2,000 house will pay interest, taxes and insurance, and leave enough to apply on mortgage to extinguish the indebtedness in about twenty-seven years. The occupant would pay for water rates and repairs. This would allow a worker to buy at the age of twenty-five and be relieved of rent paying at fifty-two, when age would be creeping upon him. Should a shorter term be desired, $15 per month would satisfy the mortgage in sixteen and one-half years if the purchaser carried all charges except interest. The sum of $15 is more than this class can usually afford to pay monthly for shelter, but results of intensive cultivation seem to show that, with proper use and management, a small garden would fully if not more than cover the extra cost and also necessary carfare.

### *Experience at Salem*

"The experience of the Salem Rebuilding Trust seems to prove that the figure of $2,000 for these homesteads can be met. After the fire in that city, there were built double five-room houses of brick, with slate roof, good plumbing, bath, plenty of light and air and expansive view, to be rented to two families at $15 per month each or sold at $3,886; $1,943 per house. Double houses with four rooms and bath for each family cost $3.582. The buildings have a general appearance of dignity, solidity and wholesomeness."

## *One Year's Fire Losses in Connecticut*

WITHIN the twelve months ended September 30, 1916, according to the report of the State Commissioners, 1,874 fires occurred in Connecticut, entailing an aggregate loss of $2,255,089. Classified as to causes the report presents the following:

Sparks (all kinds), 162; lamp accidents and explosions, 78; matches, 167; ashes, hot coals and open fireplaces, 67; cigars, cigarettes and pipes, 96; gas, oil stoves and explosions, 47; gas jets and candles, 53, defective flues, smokestacks, chimneys, 272; stoves and stovepipes, 75; spontaneous combustion, 53; furnaces and defective heaters, 16; ignition of grease, oils, paints, etc., 23; accidental, 46; electric wires, 108; gasoline, explosion of gasoline and chemicals, 41; overheated and defective ovens and kilns, 16; rubbish, 7; exposure to burning buildings, 17; lightning, 34; bonfires, 28; fireworks, 49; incendiary, 55; michievous children, 38; suspicious or mysterious, 152; carelessness, 159; unknown, 609.

### *Character of Burned Buildings*

The burned buildings are classified as here shown:

Dwellings, 1,416; stores and offices, 334; barns, stables and sheds, 277; factories, 81; hotels, clubs, restaurants, etc., 41; warehouses and storehouses, 33; railroad and steamboat property, 37; theaters, halls, public buildings and churches, 26; schools, hospitals, asylums, 22; automobiles and garages, 132; miscellaneous or sundry, 69.

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### *The Fire Tax—How to Avoid It*

OUR waste of $3 per capita per annum means that every man, woman and child pay $3 a year for fire waste. That means that the man with the average family, his wife and three children—a family of five—pays $15 a year fire tax. The United States Government in its report adds to this firewaste the cost of maintaining fire departments, which is as much more. This means $30 a year to the average family. Now, if on some blue Monday in every year a representative of the Government were to come around and ask us each for our cheque for $30 to pay our share of the national carelessness, then we should realize what we pay. But we do not realize that we pay it, because that tax is indirect. The big manufacturers and the big merchants know that this fire expense is a tax. They equip their premises with automatic sprinklers. They put in protective apparatus. They get the lowest insurance rate they can because it helps them to compete; but the man in the street, the ordinary man, does not know how this fire waste is paid."—From *A Campaign to Prevent Fire*, published by Canadian Manufacturers' Association.

## Boston Authorities Should Wake Up

MANAGING underwriters continue to be greatly exercised over the fire hazards obtaining in the congested districts of Boston and are exerting every possible influence to force improvement. The matter has been made the subject of a special inquiry by the Mayor of the city, who appreciates the gravity of the situation and is seeking a feasible plan for its betterment.

Engineers of the National Board of Fire Underwriters, who have lately completed a thorough inspection of the city, mention appreciatively the substantial number of fireproof or semi-fireproof buildings that have been erected in recent years in certain sections of Boston, but hold that their conflgration defense is considerably reduced through absence of "proper window protection." That section of the report dealing with structural conditions reads:

"In the congested value district a large proportion of the construction is non-fireproof, brick and deficient structurally, many buildings are of multiple occupancy, the district is very compactly built and streets are narrow. Block accessibility in general is fairly good, but with notable exceptions. The fireproof construction in the central part of the district and immediately to the west lowers the hazard there considerably and ordinarily should form a local pause of considerable value between sections on the north and south; absence of window protection precludes the acceptance of this construction as a reliable fire barrier. More than one-third of the construction of the district, including mainly the more hazardous occupancies, is now in fireproof buildings or protected by sprinkler equipments. The water supply is adequate. The Fire Department is well equipped for fighting single fires of ordinary magnitude, but lacks the strengthening of its service to be had from the high-pressure fire system, yet far from completion after several years of desultory construction, and which undoubtedly would reduce the likelihood of conflagration to a low degree. In nearly all parts of the district, and especially in the first, third and fourth sections, the potential hazard is high. The probability of a conflagration is considerably more marked in the section along either side and west of Washington street, where there are many high values, and the prevailing direction of winds would tend to carry a fire to the parts to the eastward. Blocks involving possibilities of serious fires are present in other sections, and because of the lack of effective breaks or barriers, under adverse conditions obtaining at times of the frequently occurring high winds there would be a pronounced probability of a conflagration extending over a large part of the district.

"In the wharf district of Boston proper the conflagration hazard is moderate. The lumber district is liable to fires of serious proportions and exposes groups of congested joisted brick woodworking plants. Charlestown, south and East Boston have stretches of wharf properties in which serious fires are liable to occur and otherwise are built up with congested frame structures, which, in many places, afford opportunity for local conflagrations. In the congested parts of Dorchester and Roxbury, where three-story flat buildings are separated by narrow spaces affording many mutual exposures, the possibility of fires extending over considerable areas is pronounced, and the hazard from flying brand fires in those sections in which buildings are shingle-roofed is serious. The closely built brick residential and tenement sections have a normally mild hazard, but are subject to group fires."

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### Sand Industry Affected by European War

An increase in the quantity of glass sand used in the United States in 1915 over that in 1914 may be explained in part by the activity in the glass industry, due to increased exports, a direct effect of the war in Europe. The production of glass sand in 1915 was 1,884,044 short tons, valued at $1,606,640. This is the largest quantity ever reported by the United States Geological Survey, Department of the Interior, which has just issued its annual statistical report on sand and gravel. Some weeks ago figures were given out for the production of glass sand in the principal producing States, but the above are final figures for the entire country.

Molding sand was produced in very much greater quantity in 1915 than in 1914, owing, in part at least, to the foreign demand for vast supplies of machinery and munitions requiring the casting of metal, which called for the use of molding sand in large amounts. The total production of molding sand throughout the United States, as reported to the Survey, was 3,585,746 short tons, valued at $2,123,203.

The report shows that the total quantity of sand and gravel produced in 1915, and reported to the Survey, was 76,603,303 short tons, valued at $23,121,617. It includes also a list of localities where glass sand was produced in 1915 and another list of localities where it occurs.

A system of terminals, patterned after the famous Bush warehouses of New York City, has been proposed for Norfolk, Va., and is being very favorably considered by the chief business interests of the progressive Southern city.

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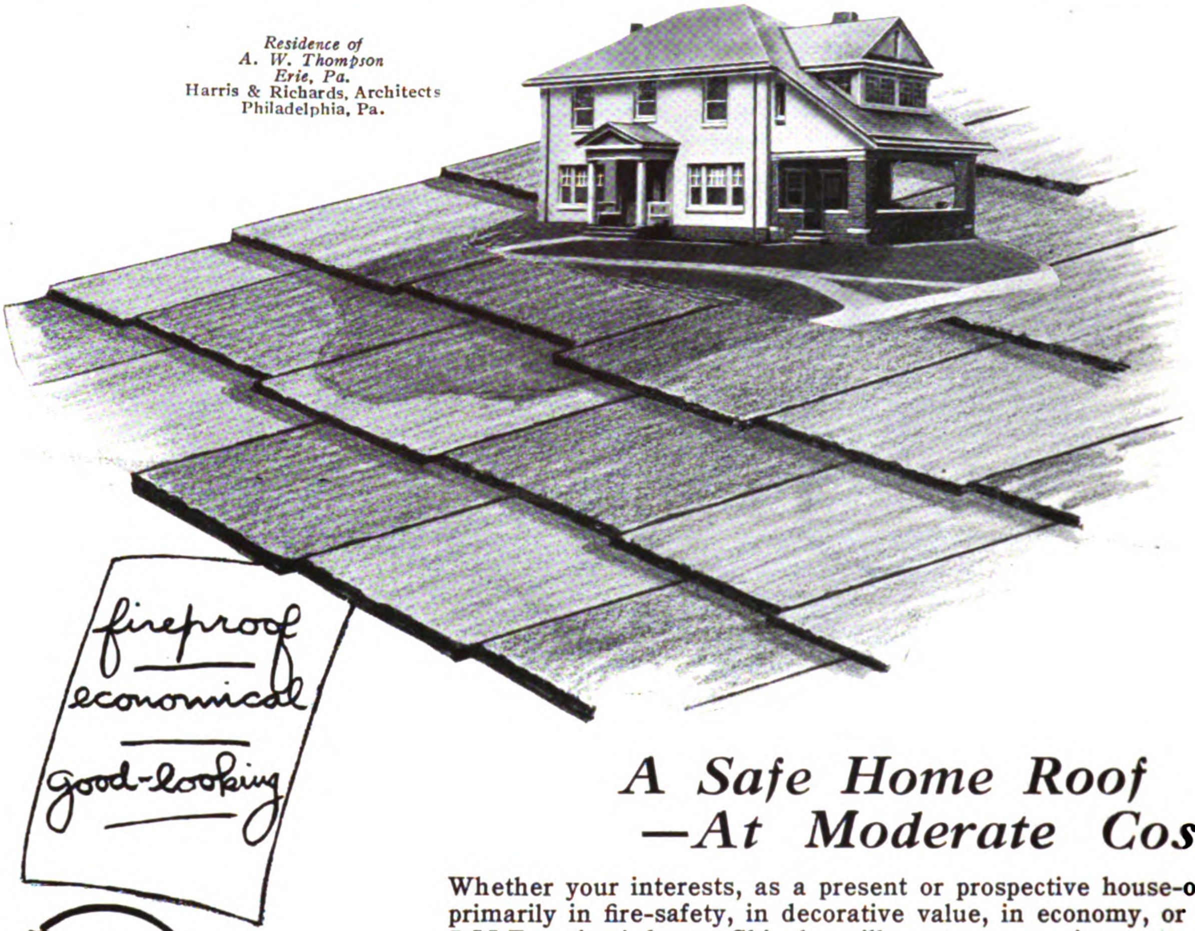
The Board also voted approval of the maps received from the Board of Water Supply showing the land to be acquired for the tunnel leading from the Schoharie Reservoir to Esopus Creek.

# JOHNS-MANVILLE

*Transite*

# ASBESTOS SHINGLES



*Residence of*
*A. W. Thompson*
*Erie, Pa.*
Harris & Richards, Architects
Philadelphia, Pa.

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

## *A Safe Home Roof —At Moderate Cost*

Whether your interests, as a present or prospective house-owner, are primarily in fire-safety, in decorative value, in economy, or in utility, J-M Transite Asbestos Shingles will meet your requirements.

Safe—because they cannot burn; a practically imperishable combination of Asbestos and Portland cement. Economical, too—whether for bungalow or mansion. Moderate in first cost, easily applied, free from warping or splitting; they actually toughen as they age on the roof. They require no painting or coating, hence effect real savings in upkeep.

And, as they are applied in such a variety of shapes and sizes, thicknesses and colors, your architect can gain an unusual roof treatment while still retaining the pleasant, artistic effect of the shingle roof.

**J-M Transite Asbestos Shingles take the base rate of insurance (Class "A" if laid American method). They are examined,** approved and labeled by the Underwriters' Laboratories, Inc., under the direction of the National Board of Fire Underwriters.

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
*Branches in 55 Large Cities*

***Ask us for the free Shingle Booklet—study the types of homes illustrated. And consult your architect—have him specify J-M Transite Asbestos Shingles.***

# SAFE HOMES

***Edited by* RALPH P. STODDARD, Secretary**
**Society Advocating Fire Elimination**

## *Where the Community Profits*

IN many rapidly growing communities the impression is gained that wood is the universal structural material for homes. This is due largely to the fact the demand for homes, of any kind whatsoever, is so urgent that the speculative builder is given a free hand to throw together any sort of tinder-box and sell it.

One of the chief reasons this is allowed by city authorities is that the public already is burdened with a more or less expensive fire-fighting system, and the erection of more frame buildings does not create a new menace—simply makes an old one more serious.

The fact is, lumber every year is showing a loss to other materials. And a considerable percentage of this loss is in newer communities, which are as yet in a position to establish the character of the city as a whole by barring frame construction and thus preventing disastrous conflagrations, without at least one of which scarcely a year passes. Often, as during last year, there are several.

Of these "fireproof" communities there are many. A few, however, are conspicuous. Among these are Forest Hills Gardens, Long Island; Gary, Ind.; Goodyear Heights, Akron; Roland Park and Guilford, near Baltimore; Marcus Hook, Pa., and a new city, to be called McDonald, which the Steel Trust will build near Youngstown, Ohio.

The most famous of all these, probably, is Roland Park. Its owners were pioneers in the field of fire elimination. Possibly the most remarkable fact about this community is that it was an out-and-out real estate selling proposition—not a paternalistic village built without thought of profit. From a small beginning this "allotment" has expanded until now more than a thousand acres, comprising Roland Park and its adjoining neighbor, Guilford, have been sold and built up under the strictest fire-prevention restrictions, which virtually barred wood.

As to the success of the plan from the standpoint of the company, President E. H. Bouton says:

"We have found restrictions so advantageous that, with the growth in the appreciation of their advantages to the owner, we have found that there was a demand to make them progressively more rigid. Those who have lived under the protection of restrictions value them highly and many would not live in unrestricted property, if they could help it."

Another community which has attracted wide attention is Forest Hills Gardens, Long Island. This development is the work of the Russell Sage Foundation. Its managers have "gone the limit" and have made it as nearly "fireproof" as possible, wood being used only for interior trim.

It is unquestionably the most perfectly protected against fire of any community in the country. During the first year of its existence it had only two fires—one by the overturning of a plumber's torch in an unfinished building, which did no damage, and the other in a tailor's shop in the Inn, which consumed the contents of the room where it started, but which was confined to this room by the fireproof construction of the building.

Aside from the fireproof feature is the permanence of all structures in Forest Hill Gardens. This tract was developed with the object of paying a fair return upon the money invested at moderate sale and rental values. In those for rent new low records of maintenance have been established, which have proven revelations to owners of rental property.

The so-called Steel Trust cities are conspicuous for the policy followed of making them consistently "safe." At Gary little else but concrete is to be found, the few frame buildings there are being scattered on the fringe of the town, away from the influence of the company. The new Carnegie Steel Company town of McDonald, Ohio, will be built up entirely of concrete, burned clay, steel and expanded metal. The immediate building program is reported to embrace about one thousand homes.

Goodyear Heights, at Akron, is not a town, but is a model allotment laid by those interested in the Goodyear Tire and Rubber Company to provide good housing for such of its employees as have families. The houses, of which there are close to three thousand, were built and sold to employees on a basis, which netted a small return on the money expended. All are fire-safe, the structural materials being hollow tile and expanded metal, with stucco facing. The result is a very pleasing general appearance, as tints are liberally used in the stucco, relieving the monotony of white wall and green or red roofs, which sometimes mar the general effect of groups of this type.

At Marcus Hook, Pa., the Viscos Company has built up a little community about its plant that is a model of its kind. All the houses are tile faced with brick, and have slate roofs. These homes are the acme of convenience for the housewives. For the company they have proven remarkably economical.

One of the most comprehensive plans for providing workingmen's homes is being undertaken by the Real Estate Board of Cleveland, Ohio. A $300,000 company has been organized to operate in any part of the city, where need arises for additional housing.

Secretary McMichael, of the board, has given a great deal of study to the Schmidlapp properties in Cincinnati. These are entirely fire-resisting. This type of construction has led to low upkeep, which saving the owner has shared with his tenants. The Schmidlapp buildings and many other fire-safe communities are being studied by the Cleveland real estate men, with a view of making the Cleveland project one of the best in the country.

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## *Lumbermen Fighting Hard*

ONE of the mysteries of the building supply trade is the antagonism with which the lumbermen meet every effort on the part of the makers and dealers in "substitutes"—as they call burned clay, cement and other fire-resisting materials—to promote the use of their products.

In no industry have such enormous amounts of money been spent for promotion work as in the lumber trade. Practically every kind of wood is represented by an association of manufacturers, which usually maintains a bureau for advertising and for distributing literature pertaining to the particular wood produced by its members.

Attention is called to the phenomenal success of the promotion work some of these associations have undertaken, as reason for their apprehension at the activities of the makers of fire-resistive products. A single case will illustrate the measure or the success of their trade promotion work. Red gum was, until a few years ago, considered a distinctly inferior grade of lumber for which there was little or no commercial use and practically no market. Extensive and intelligent promotion work has, within a few years, made this wood popular for interior finish. Its price has been doubled and tripled, until now it is one of the most profitable of the forest products.

With such instances in their minds, it would not be surprising if the lumbermen have "chills" when they contemplate the growing activities of the makers of safe materials along trade extension lines, were it not for the fact that lumber and carpenter work still form the largest cost item in residence construction. Regardless of what exterior walls are constructed and what the roof covering, on an average of 40 per cent of the entire cost of the house goes to the carpenter contractor. Of this amount the lumberman, of course, gets his share.

If it is true, as the lumbermen state, that the annual loss to other materials which the lumber trade suffers is due to the greater volume of building in cities, where the use of wood is restricted, then the last possible explanation of their fears is eliminated, except—panic.

In comparison with the aids that for years have been given builders by the lumbermen the work of the most advanced of the safe material bureaus, namely, that maintained by the Cement Association, leaves off practically where the lumbermen begin. Even in the smaller communities it has always been easy to obtain aid from the lumber makers and dealers in financing building operations, provided, of course, that the building material was wood. The extent to which this aid has been and is now carried in some cases, is a source of surprise to those not familiar with the methods the lumbermen have adopted to make their product, so far as possible, the universal building material.

In view of these conditions, taken as a whole, the opposition offered by the lumbermen to the activities of the safe material makers and dealers is one of the mysteries of present-day business.

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## *A Sample of Dangerous Construction*

A NEWS dispatch from Hartford, Pa., under date of the 16th inst., tells of the serious injury of a number of persons who were trapped in a burning building in that community. Nearly half the citizens of the town were dancing upon the second floor of the Odd Fellows Hall, "when a large oil lamp, suspended from the ceiling on the first floor, fell with a crash." The structure, a huge wooden affair, was ablaze in an instant, "escape down the narrow stairway being blocked by a sudden rush of flames. Men, women and children, crowding the floors above, were panic stricken and many of them jumped from the windows; ten of the number being very badly hurt."

The building in question was but a type of many found in all parts of the country. Of frame construction throughout, with but a single stairway, narrow and without substantial support, it was a standing menace to persons congregated within it walls. Once ablaze it burned swiftly and completely, as all such shell affairs do, and will continue to do so long as they are permitted to exist. How long will the American people tolerate this menace?

**WEATHER:**
Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

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New York City, N. Y., February, 1917

Priceless

# COMPARATIVE FIRE LOSSES

## Many Notable Fires Cost Millions of Dollars Within the Past Six Weeks

A table showing comparative per capita fire losses in various countries throughout the world has been compiled by the National Board of Fre Underwriters. Necessarily such a table is incomplete, as it deals only with the figures obtained from certain cities in each country. Excepting the United States, the number of cities reporting is very small and not representative, particularly in Canada. Nevertheless, the compilation contains interesting comparisons. The column headed "Population" refers only to that of the cities reporting for 1915:

| | 1915 | Population 1915 | Per Capita Loss, 1911 | 1912 | 1913 | 1914 | 1915 |
|---|---|---|---|---|---|---|---|
| Canada | 3 | 294,344 | 2.61 | 2.88 | 2.46 | 3.58 | 2.79 |
| United States | 333 | 35,161,266 | 2.62 | 2.55 | 2.35 | 2.32 | 1.94 |
| Chile | 1 | 220,000 | ... | ... | .30 | ... | .58 |
| England | 8 | 6,442,239 | .53 | .54 | .33 | .67 | 1.03 |
| France | 3 | 3,957,729 | .81 | .84 | .49 | .63 | 1.02 |
| Germany | 2 | 423,673 | .21 | .20 | .28 | .17 | .49 |
| Ireland | 2 | 701,500 | .58 | .57 | .28 | .39 | .55 |
| Italy | 3 | 1,078,691 | .31 | .90 | .25 | .37 | .62 |
| Norway | .. | 253,000 | ... | .69 | .32 | .48 | .72 |
| Philippine Islands | 1 | 234,409 | ... | ... | 4.41 | 1.28 | 1.00 |
| Russia | 1 | 2,000,000 | 1.17 | .84 | .89 | 1.19 | .95 |
| Scotland | 3 | 1,534,591 | .56 | .49 | .36 | 5.35 | 1.62 |
| Spain | 1 | 608,700 | ... | ... | 2.30 | .15 | 3.13 |
| Sweden | .. | 392,427 | ... | .13 | .74 | .54 | .29 |
| Netherlands | 1 | 321,853 | ... | .12 | .11 | .07 | .14 |

### 11 Months' Fires Cost $210,000,000!

As stated in a previous issue of CONSTRVCTION, within the eleven months ending December 1, 1916, property valued at over $210,000,000 was consumed by fire in this country and Canada. Poor construction, carelessness and outright criminality are the factors mainly responsible for this appalling waste.

### Recent Notable Contributions

Nearly every day brings reports of large fire losses. Within the last month several notably severe fires, both individual and collective, have occurred.

Of the individual losses, perhaps none wrought such damage as the fire which destroyed the great plant of the Canadian Car and Foundry Company at Kingsland, N. J., causing an expense estimated in the neighborhood of $12,000,000. As insurance in this instance totaled $3,250,000, the extent of this big industrial fire can be appreciated. It is understood that insurance placed in the United States amounted to about $2,300,000, and it is believed that London Lloyds faced a large amount of the risk. Apparently there will be no salvage, and the loss amounted to many millions of dollars above the insurance. Owing to this and similar losses in the United States, many American insurance companies have determined to cancel all insurance covering munition plants where the loading of shells is carried on.

### Kingsland Brick Co., Goes Down With Munitions Plant

When the above explosion and resulting fire destroyed the Canadian Car and Foundry Company's' plant it put out of business the Kingsland Brick Company, Kingsland, N. J., which adjoined the munition factory. The loss will not be far from $50,000. D. B. Kinney, of New York, owned the brick plant. It is not now known whether or not rebuilding will take place. This was one of the few plants in the East that manufactured brick of ground shale and was operated all the year round. The men were at work when the explosion sent a shower of shells and building debris amongst them. Many did not stop for their lunch buckets and outer clothing when they left the building.

### Chickasaw Cooperage Company's Fire

Down at Memphis, Tenn., a devastating fire recently swept throughout the plant of the Chickasaw Cooperage Company, located just outside the city limits. The loss amounted to $6,400,000, as this was the largest cooperage plant in the Southland. Had it not been for the fire-resisting qualities of the materials used in the construction of the factory the total loss would have been considerably greater. At the storage shed still stands the brick wall which protected a vast amount of materials and supplies, as well as the office, valuable books and papers of the company. The Memphis Brick Supply Company, taking advantage of this condition, carried an advertisement in the local paper.

### Omaha Has a $750,000 Blaze

At Omaha, Neb., on February 23d, early in the day, fire in the downtown district destroyed practically an entire block of business structures, constituting the largest of the month's collective fire losses. The Berg Clothing Company and the Hartman Furniture Store were among the principal losers.

The captain of a fire company was injured, probably fatally, by falling walls. Five other men were caught under a shower of falling material, but unfortunately escaped serious injury. The loss may total more than three-quarters of a million dollars.

### Another City Loses Half a Million in Fire

At Utica, N. Y., on February 9th, fire causing an estimated loss of at least half a million dollars occurred in the heart of the commercial section of Herkimer this morning. The new Earl Block, Masonic Block and Graves Block were demolished by the flames. The large department store of H. G. Munger & Co., occupying the ground floor of the new Earl and Masonic Block, was the starting place of the fire, which it is thought began with an explosion.

In addition to the Munger store, the business places burned are a shoe store, tailor shop, drug store, hardware, grocery, three clubs, including the Masonic, Odd Fellows and Katts Clubs, six lawyers' offices and the local newspaper plant of *The Evening Telegram*. Damage was also done to the First National Bank Building, Municipal Hall, Copeland Block, Dr. Graves' Block, Huyck property and the Dr. Kay property. Nearly all of the plate glass windows in these blocks were smashed. The Herkimer County Grange Block was also burned.

### School Fire On Shingle Roof

In almost every instance fire may be avoided, or at least positively confined to its place of origin. State and municipal law-makers must be held primarily to blame for permitting the erection and maintenance of structures of combustible material or so poorly constructed as to foredoom them to destruction by fire and to threaten the safety of the community generally. Until the fact that every fire is a crime is driven home to the people of this country, and our statutes are framed to that end, it is idle to expect any marked diminution in the fire waste.

The following is an illuminating record of "what might have been" had these school children lost their heads instead of properly responding to the fire drill:

"Walter H. Bennett, State Fire Marshal of Illinois, is conducting a campaign to remove fire hazards from the schools within his jurisdiction. He states that, "only through the fortune of Providence" has Illinois been spared the tragedy of a great loss of life in a school fire."

As a concrete example of the benefits to be expected through the campaign, Mr. Bennett points to a recent school fire at Springfield, where, last April, the Department made an inspection of the schools, the inspectors recommending that at the Ridgley School an incombustible roof should be substituted for the wood shingle roof.

The school authorities, states Mr. Bennett, were not in accord with the recommendation, and, as in the case in hundreds of other American cities and towns, *nothing was done*.

But on November 15th last *the school was burned*, with a loss amounting to more than $20,000. *Only the fire drill saved many children from death!* AND THE FIRE, *ALSO AS USUAL*, WAS CAUSED BY SPARKS ON THE WOOD SHINGLE ROOF.

### From All of Which

it must be realized that we Americans, while a wonderful people in so many respects, are, nevertheless, woefully hindsighted in many ways. For years our annual fire waste has run over the $200,000,000 mark as computed directly by insurance interests. Indirectly it is certainly no exaggeration to say that the annual fire waste really reaches two billions of dollars. Yet with all the advancement attained in producing standard firesafe building equipment and materials at a cost eventually *cheaper than wood*, and in many instances initially no greater than the cost of inflammable material, the nation, as a whole, goes on in its blind building career. As a city gets well stung by the sweeping flames, which tear out its business or residential districts (sometimes both!) the citizens of that particular community suddenly wake up, and realizing that they must build a better and safer Utica, or Herkimer, or Paris, or Salem, or Davenport, or Augusta, or Nashville, proceed immediately to "get themselves on the job."

Well and good, better late than never (though better never late).

But other cities, figuratively within a stone's throw of the devastated spots (within the same and nearby States) pull their cloaks of indifference over their already blind eyes, shove their heads into the sands of ignorance or criminal neglect and trust to Providence—until a time arrives when they too late, feel the withering scorch upon their slothful frames! It is an insult to intelligence to boast of American home and small structure construction. Of course, there are exceptions—and they are most fortunately becoming more numerous; but it is still painfully true that the average American residential and business district is a conglomeration of questionably artistic and undeniably hazardous tinder boxes in which reside merchandise, valuable records—and human beings!

Phone, Cuy., Lake 93 Phone, Bell, Marlo 1672

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DEALERS IN

**BUILDERS SUPPLIES**
**and IRON SPECIALTIES**

Alpha Portland Cement, Bulk Lime, Hydrate Lime, Plaster, Sewer Pipe, Flue Lining, Const. Tile, Drain Tile, Brick, Fire Brick, Fire Clay, Crushed Stone, Sand, Slag, Mortar Colors, Waterproofing, Floor Tile, Angle Iron, Dampers, Ash Dumps.

OFFICES AND WAREHOUSE:
**11201 BEREA ROAD**
**LAKEWOOD, O.**

## SCHLAFLY CELEBRATED BY FRIENDS

### General Superintendent Begins at 31st Year With Berger Mfg. Co.

"Thirty years ago Ed. Langenbach (now our president, but at that time our shipping clerk) and myself delivered the entire daily output of The Berger Mfg. Co. to the freight depot in a hand-cart. In those days all we made was eave-trough hangers, eave-trough and conductor pipe. To-day the Berger institution is shipping from 25 to 35 carloads every 24 hours, of building specialties and steel office and factory equipment. Our factory then was located on Rex street, in a building 16 x 28, giving 896 sq. ft. of floor space.. To-day we have nearly 27 acres of working space."

So reminisced Mr. Julius H. Schlafly, General Superintendent for The Berger Mfg. Co., who has just completed his thirtieth year of service for that concern. An interesting feature is that Mr. Schlafly is not an old man ready to retire, but is a young man just getting a good start, with the most productive part of his working life still ahead.

Cautious citizens have always been interested observers of the steady growth of The Berger Mfg. Co. from a two- or three-men shop to a great plant employing hundreds of men and covering nearly 27 acres of floor space. Mr. Schlafly went to the Berger Mfg. Co. in 1887 shortly after its organization. He was a lad of sixteen, hungry to learn and willing to do everything in his power to serve the best interest of his employers. Naturally his first work was of an unimportant nature, but his tendency to be careful and thorough in the execution of small duties brought him steady promotion, and as the Berger institution grew, he grew with it.

In fact, the energy, loyalty and co-operation of Mr. Schlafly have been an important factor in the remarkable growth of the company. To-day, in his position of General Superintendent, with the immense responsibilities resting on his shoulders, Mr. Schlafly is as jovial, kind-hearted and patient as in the old days of thirty years ago, and it goes without saying that he is held in high esteem both by the employees who serve him and by the directors and managers of the company.

On March 5th, the date of the anniversary, many of Mr. Schlafly's business and personal friends took occasion to remember him in different ways, and, as Mr. Schlafly expressed it, "My little celebration may not be of so much importance as that other celebration taking place in Washington to-day, but it means more to me, and with all the encouragement and good words that I have received from my friends, I feel that my entrance on my second thirty years is indeed propitious."

◆

## INLAND STEEL CO. WILL REGORGANIZE

By taking advantage of the more liberal Delaware laws and forming a company bearing the same name, which will take over present plants and other assets, it is proposed to reorganize the inland Steel Company, of Illinois.

The new corporation will be capitalized at $30,000,000, $25,000,000 of the stock to go to holders of Inland Steel shares in payment of present shares, which is based on 2½ shares of the new for 1 share of the old stock; $5,000,000 in new stock will remain in the treasury.

◆

## KENTUCKY FIRE PREVENTION ASSN.

Giving special attention to building in smaller cities not having paid fire departments, the Kentucky Fire Prevention Association has organized an active campaign which promises results and the furtherance of the constructive influence of the organization. Usually holding twelve meetings a year, the number will be increased to eighteen for 1917, three in each of the six districts into which the State has been divided. Each district is in charge of a committee of the membership. Local fire insurance company agents and field men will conduct the meetings, which in general will be committee gatherings with city officials and prominent property owners, instead of public meetings, which have not brought such results as might have been expected.

## SOUTHERN CEMENT USERS' ASSN.

Concrete products manufacturers from many Southern States met recently at Chattanooga, Tenn., to talk over their problems, with the result that an organization for the advancement of the industry was started. This is the first time in the history of the Southern concrete industry that an effort was made to bring together those interested whose places of business are located in the Southland.

Makers of concrete products throughout Kentucky, Tennessee, West Virginia, Virginia, the Carolinas, Florida, Georgia, Alabama, Louisiana, Mississippi and Arkansas have long realized the need of an association to disseminate information in an organized effort toward business betterment.

C. M. Wood, manager of the Cement Products Bureau of the Portland Cement Association, is responsible for the initiatory move.

Among numerous names suggested, that of "The Southern Cement Users' Association" was adopted.

Following are those who took an active part in discussing the formation of this latest of cement associations: O. T. Roehl, Morgan & Rhoel, Knoxville, Tenn.; C. N. Wiley, Standard Portland Cement Co., Birmingham, Ala.; A. N. Shearman, Athens, Tenn.; P. A. McArthur, Birmingham Slag Co., Atlanta, Ga.; W. Jess Brown, Dixie Portland Cement Co., Athens, Ga.; John H. Dalbey, Dixie Portland Cement Co., Chattanooga, Tenn.; J. P. Gooch, Delta Cement Tile Co., Greenville, Miss.; P. D. Burks, Portland Cement Association, Atlanta, Ga.; G. A. Olsen, Roch Products and Building Materials, Chicago, Ill., and C. M. Wood, Portland Cement Association, Chicago, Ill.

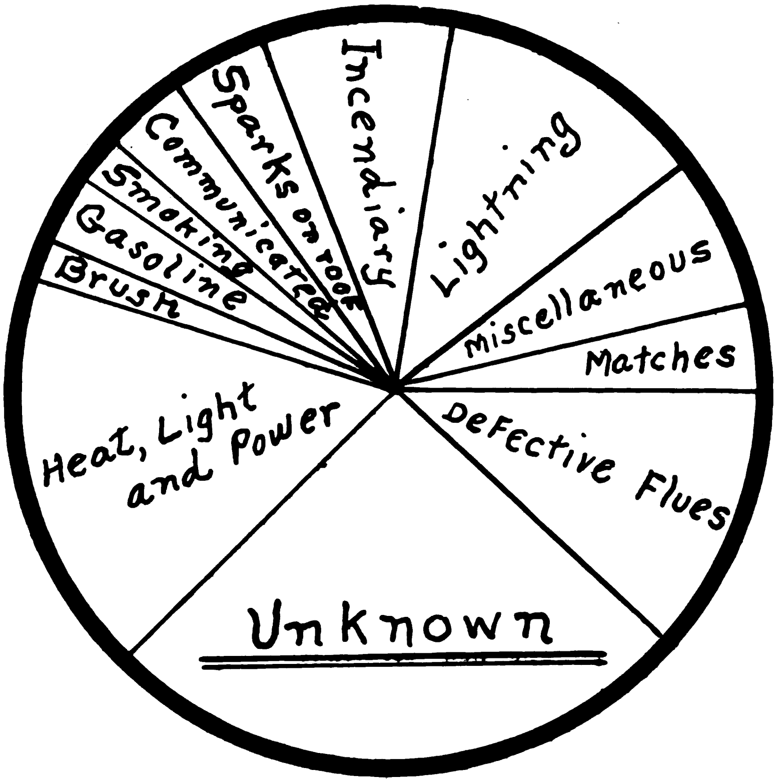
◆

Ironclay Brick Co., Columbus, O., has reduced its common stock from $200,000 to $100,000, the preferred stock remaining at $100,000.

◆

At Cleveland, O., recently a meeting of building material dealers and lumbermen was held to discuss legislation to come before the present session of the Ohio General Assembly.

# "Fires of Unknown Origin"



*The above graphic chart illustrates the ratio of destruction by fires of unknown origin to the total amount of fires in the State of Wisconsin during the year ending June 30th, 1915, as shown by the report of the State Fire Marshal. In this State the recorded destruction by fire for the year was $4,364,195, of which $1,001,455 was caused by fires of unknown origin.*

# –Impossible When "Aero" is Installed

AERO AUTOMATIC FIRE ALARM SYSTEM discovers a fire in its incipiency and promptly sends out the alarm. Gives warning before the fire gets beyond control; summons help, when help is most needed, in the first stages of a fire—when it can be extinguished before serious damage has been done.

*Investigate "Aero" Fire Protection. It is the most efficient least costly method you can install.*

**AERO FIRE ALARM COMPANY**

**Havemeyer Building, 26 Cortlandt Street, New York**

# The Fireproofing News

### GYPSUM TILLER FOR CONCRETE FLOORS

In several large buildings there has recently been used a type of floor construction consisting of a reinforced concrete T-beam slab with gypsum filler tiles in the spaces between the beams and ribs. These tiles are hollow boxes, closed on all hides, the solid ends tending to reduce the loss of concrete at the joints when the concrete is poured. The bottom makes a good surface for the interior plastering.

This construction has been used in the Dawes Y. M. C. A. Hotel, Chicago, Ill., and the Castle Hotel, Omaha, Neb. The tiles are manufatcured by the United States Gypsum Co., Chicago.

◆

### NEW FIRESAFE CONCERNS

The old Fort Payne fire-brick plant at Fort Payne, Ala., has been bought by J. B. Hammond & Co., Bolivar, Pa. This plant, built by Boston capitalists, will be remodeled to supply 300,000 brick per month.

Sacramento Clay Products Co., Sacramento, Cal., has been incorporated.

Los Angeles Pressed Brick Co., Cal., has erected a large hollow tile building 100 x 200 feet at its new plant at Alberhill, Cal., the structure to be used for hand-work and specially designed brick. Forty-five men are at work in this new plant, and this force will shortly be doubled.

California Clay Cor., San Francisco, Cal., has been organized to manufacture a wide variety of clay products. Some $85,000 will be required to set up machinery and place this firm on a paying basis.

Hoosier Clay Products Co., Hillsdale, Ind., has filed papers of incorporation announcing capital stock amounting to $225,000. Directors are D. S. Strong, W. E. McKee and R. W. Sutton.

Mohawk Clay Products Co., Perrysville, O., has increased capital stock from $75,000 to $125,000.

William W. Lewis, Chas. S. Lewis, H. J. Everitt, I. M. Ellenwood and J. G. Wilt have incorporated, with a capital stock of $40,000, the North Baltimore Clay Co., North Baltimore, O.

Builders' Supply & Manufacturing Co., St. Mary's, Pa., has been organized, with a capital stock of $40,000.

### PORTLAND CEMENT LAST YEAR

1916 holds the record for Portland cement shipments, 1913 coming next, when 88,689,377 barrels were shipped. In production, 1913 is still the banner year, with an output of 92,097,131 barrels, though there still remains a possibility that complete returns for last year may give 1916 the lead.

Exclusive of a few points where top prices reigned in 1915, higher prices for cement prevailed all over the United States. Trade conditions are reported as much better than in 1915. In numerous places the only limitation in output was due to car and labor shortage.

1916 saw six new plants making Portland cement, one each for California, Minnesota, New York, Oklahoma, Oregon and Texas.

◆

### TRADE NOTES

The Berger Manufacturing Company, Canton, Ohio, announces the following appointments: R. W. Van Horn, who for the past six years has been connected with the New York branch, in charge of the Metal Lumber Department, has been transferred to the home office and placed at the head of the Building Material Products Division.

◆

Norman A. Hill, recently efficiency engineer for the Dupont Powder Company, Wilmington, Del., and formerly engaged in appraisal work for the Public Service Commission in Maryland, has been appointed Efficiency Engineer, with headquarters in the home office of the Berger Manufacturing Company.

◆

P. V. Stonerod, formerly inspector of steel for the Carnegie Steel Company and for the past few years connected with Berger New York Branch in the capacity of Construction Engineer, has been placed at the head of the Sidewalk Light Department, and will be located in Canton, Ohio.

◆

A. H. Bromley, Jr., Contracting Engineer, who for the last several years has looked after the interests of the Berger Manufacturing Company in the Cleveland territory, has been appointed Chief Engineer of Sales Department, and hereafter will be located in the Canton office.

### MONMOUTH'S ASSN'S FIRST YEAR

The Monmouth Manufacturers' Association has done much during the first year of its existence. At first a few plant managers, the organization has increased its membership, and is now regarded as one of the most active manufacturers' associations in the New Jersey Raritan River district.

During 1916 meetings were held about once a month at Keyport and Matawan. Poor shipping facilities was amongst the first lot of problems approached by the membership. Many conferences were held between railroad officials and others, and while all sought for improvements were not obtained, conditions were greatly improved.

Rightly feeling that they have achieved a good start, the members plan for greater accomplishments this year in the way of improvements aiding manufacturing.

The Monmouth Manufacturers' Association is composed largely of clay products manufacturers. John Fritzinger, Perth Amboy, superintendent of the National Fireproofing Company's plant at Lorillard, is president of the association.

◆

Edward Rodgers was reelected president, and Eben Rodgers secretary, at the annual meeting of the stockholders of the Alton Brick Company, of Illinois.

◆

California Brick Co., Decoto and Livermore, Cal., will spend $100,000 during the early part of 1917 for improvements and enlargements.

◆

Los Angeles Pressed Brick Co., Los Angeles, Cal., has asked the Board of Public Works to alter city specifications so as to permit the use of a new radial interlocking brick for certain classes of work.

◆

Alsey Brick & Tile Co., Alsey, Ill., plans to install machinery which will increase its capacity to 40,000 brick per day.

◆

Minnesota Farmers' Brick & Tile Co. has changed its name to the Austin Brick & Tile Co.

"Par-Lock"

TRADE MARK REGISTERED

A MECHANICAL PLASTER KEY

Machine Application of a Mastic
FOR PERMANENTLY BONDING
PLASTER—STUCCO—CEMENT
TO STRUCTURAL SURFACES

POSITIVE DAMP PROOFING

*Write Us Today For Further Information*

Sold and Applied By

MASTIC BOND COMPANY
Incorporated

18 East 41st Street New York

Telephone Murray Hill 8550

## SCATTER YOUR CATALOGS

The sending of catalogs here, there and everywhere may appear to many people to be a fruitless undertaking. Yet, according to *Industrial Canada,* in such a widespread dissemination of business literature much effective work is done.

In a recent report of W. T. Wickham, late H. M. Trade Commissioner in New Zealand, he appealed to manufacturers to send him their business literature for reference purposes. These catalogs he promised to file in his office and use them with discretion. The response to his appeal was most disconcerting. Not a third of the manufacturers sent him their publications.

It is doubtful if but very few firms could advance proper reasons for failing to comply with so simple a request. With a majority there was an obvious lack of interest, not to speak of enterprise, which is most mysterious, especially as practically all manufacturers desire to get their share of trade extension.

◆

## FIRESAFE ROOFING IN WOOD SHINGLE STATES

According to New Orleans manufacturers of composition roofings, the demand for their product continues to show great increases, most of the Southern business at present being in the sections of Mississippi, Florida and Alabama struck by the terrific midsummer hurricane. The work of putting new roofs on hundreds of houses in these parts is progressing and the composition roofing interests are well pleased with the way in which their roofs stood up under the unusually severe winds of what was almost a record-breaking storm. Few of the prepared roofs were injured by any of the winds in the storm cities, despite the unreliable claims of the wood shingle associations to the contrary.

◆

It is reported that the General Roofing Company will erect a warehouse at New Orleans which will have a capacity of 35 cars of roofing. This company plans to put forth a special effort to develop its Latin-American trade, for which it will use the New Orleans location as its port of export to South America. G. H. Garcia has been appointed their representative in Guatemala, and they are arranging now for representation in all of the Latin-American republics.

◆

*Some people aren't busy when they're working; others aren't working when they're busy.*

◆

## ROOFING ORDINANCES IN FORCE

Following is a partial list of cities requiring the use of fire-resistive roof coverings within their respective limits: Allentown, Pa.; Augusta, Ga.; Birmingham, Ala.; Cambridge, Mass.; Charleston, S. C.; Chelsea, Mass.; Columbus, Ga.; Easton, Pa.; El Paso, Tex.; Fall River, Mass.; Hoboken, N. J.; Jacksonville, Fla.; Lawrence, Mass.; Montgomery, Ala.; Newark, N. J.; New Orleans, La.; Norfolk, Va.; Paris, Tex.; Paterson, N. J.; Perth Amboy, N. J.; Portsmouth, Va.; Reading, Pa.; Richmond, Va.; Savannah, Ga.; Salem, Mass.; Somerville, Mass.; Tampa, Fla.; Trenton, N. J., and Wilmington, Del.

◆

## BIG CLAYFIELD FOR FIRE-BRICK

Chicago Retort & Fire-Brick Co., of this country and Canada, will soon mine fire-clay from a tract of 480 acres in Goose Lake township, Grundy county, Illinois, leased from William Anderson. The clay will be shipped to the Canada plant at Ottawa to be manufactured into fire-clay and other refractory products. Mr. Anderson will receive about $1,000 a month for the clay mined from his tract. People controlling an interest in another tract near that owned by Mr. Anderson, and which contains extensive deposits, are negotiating with the Illinois Steel Co., for the sale of their holdings.

◆

C. F. Massey Co., Chicago, Newark, Minneapolis, Spokane, Des Moines, Memphis and Anna, Ill., has bought a 6-acre tract, on which it will erect a new concrete plant.

Roanoke Cementile Cor., Roanoke, Vt., now operating a temporary plant, plans to establish a permanent manufactory on Jefferson street near the Roanoke River for the making of concrete tile roofing.

## BREAKING IN THE NEW MAN

When a new man begins work in an office or a department he is often left to shift for himself without an outline of his duties or an introduction to those around him, says a writer in *The Dodge Idea.* It is good to hear what a young man told me once.

"When I began here," he said, "the manager of this department talked things over with me for nearly an hour. He told me the names of the officers of the firm, and what they did, the names of all the heads of the departments I would come in contact with, the names of the other people here in the office, the names of the leading houses we did business with, and gave me a good general idea of the work of the whole office and special outline of my duties and possibilities. Then he took me around and introduced me to many of the people. The result was that I quickly got my bearings, felt at home from the start, and soon settled down to hard work. In my previous position with another firm my experience was different. There were no introductions and no outline, and no general information. My first three months were practically spent learning what the manager could have told me in an hour if he had taken the trouble to do it. The work here is twice as complicated as it was there, but I got the general plan of it well in hand the first day."

Every manager should, for the moment, put himself in the place of the new employee and realize what a confused sense he must have of a large and unfamiliar business, and how easily that confusion could be taken away by a good talk about the work in general.

◆

Cleveland Builders' Supply Co., Ohio, is using large display space in local papers as part of the general Cleveland movement to exploit face brick.

◆

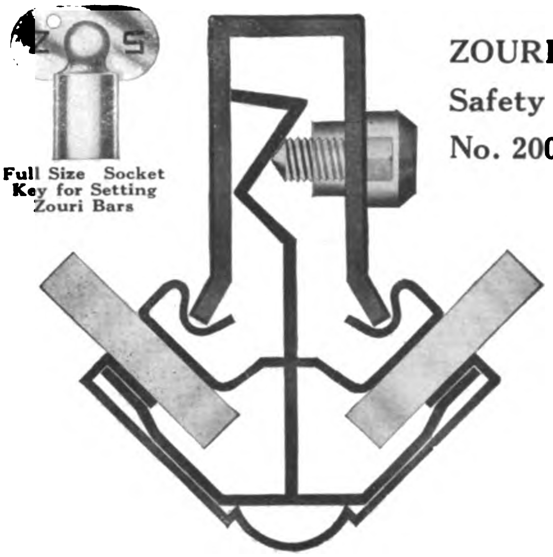
Builders' Supply & Fuel Co., Cleveland, O., has an option on land at Euclid avenue, Strathmore avenue and the Nickle Plate tracks, East Cleveland, where it plans establishing a supply yard.

◆

*Everybody knows enough to be honest—some haven't got the technique!*

# ZOURI

## Safety Store Front Construction



**Full Size Socket Key for Setting Zouri Bars**

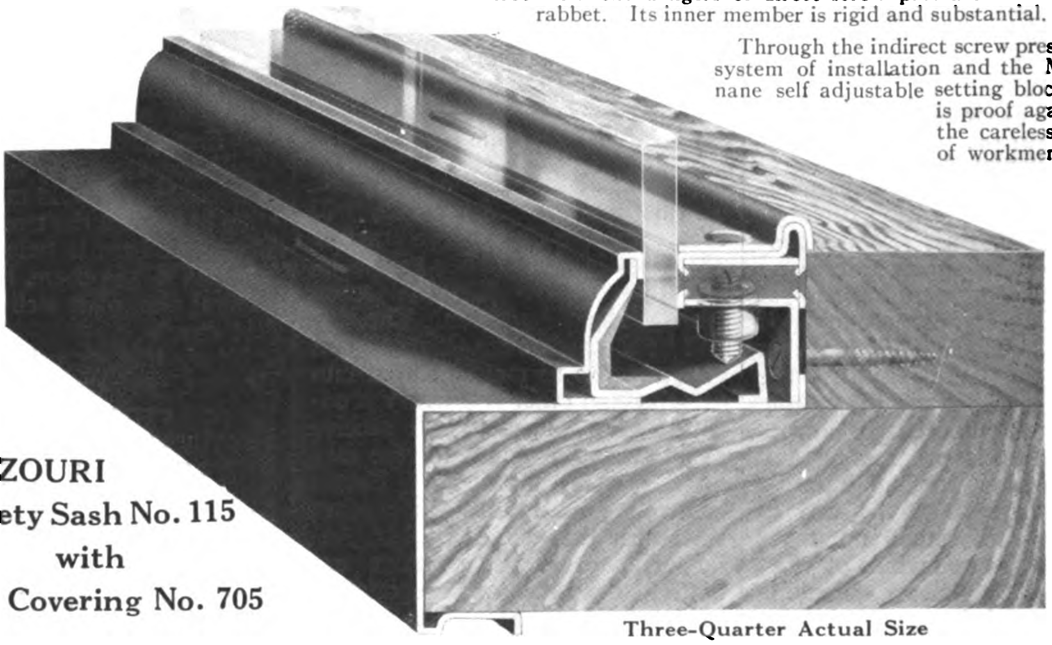
**FULL SIZE**

### ZOURI
### Safety **Key-Set Corner Bar**
### No. 200

Zouri Safety Key-set Corner and Division Bars are free from direct screw pressure. They are proof against the carelessness of workmen. They can be set only with the small special socket key shown, so that undue pressure cannot be exerted by the tools used in the building line, the power of which is beyond control. These bars are specially constructed so that the edges of the glass **cannot** come in contact with the metal.

The Zouri Safety sash is ornamental and the safest known setting for plate glass. There are no screws visible. It is free from the dangers of direct screw pressure or resilent rabbet. Its inner member is rigid and substantial.

Through the indirect screw pressure system of installation and the Murnane self adjustable setting block, it is proof against the carelessness of workmen.



ZOURI
**Safety Sash No. 115**
with
**Sill Covering No. 705**

Three-Quarter Actual Size

***DETAILS MAILED ON APPLICATION***

# Zouri Drawn Metals Company

**1813-1833 East End Avenue** **Chicago Heights, Illinois**

**Operating under Murnane and Marr Patents**

**AGENTS IN THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA**

## MODERN DEVICES LESSEN FIRE LOSS

What modern fire protective devices and methods have accomplished for one of the worst districts of Greater New York may be duplicated in hundreds of other hazardous localities.

The Greenpoint and Eastern District sections of Brooklyn up to within the past two years have always been a source of worry to fire companies. Frame dwellings of the cheaper type, numerous old factories, a careless tenantry, and all the other evils that generally accompany territory which has been built up many years ago furnished ample activity for the engine and hook-and-ladder companies. Added to these were the extensive plants of the Standard Oil Company, the large lumber yards, and many smaller concerns, all handling highly inflammable materials.

Owing to the burnable nature of products of these firms, a mere spark would suffice to set the blaze going and in a few minutes huge tanks of oil, large piles of lumber and other dangerous materials would be aflame, with no possible chance of saving them. In all these cases the fire-fighters would devote their main efforts to keeping the flames from spreading. One fire is remembered where the blaze started in some explainable way, yet the loss ran into several hundred thousand dollars and many persons lost their lives.

### Lack of Adequate Defensive Methods

This and other fires of considerable magnitude could be attributed to lack of adequate facilities and devices with which to overcome them. Now a remarkable change for the better has been effected, especially in the installation of automatic devices. It is one of the peculiar properties of an oil, naphtha, benzine and kindred products that pouring water on them simply spreads the flames. All the big oil works are now equipped with the steam and foam systems. The tank containers are encased in jackets which permit immediate automatic flushing with live steam, and some with a peculiar foam which extinguishes fires.

## STEEL CHECKS BIG STRUCTURAL WORK

President W. D. Henry, National Fire Proofing company, Pittsburgh, Pa., referring to the unusually large amount of factory and dwelling construction accomplished in 1916, and the noticeably small amount of large structural building, stated that "during the past three or four years the building business which relates to large structures has been unsatisfactory, and during the past six months has shown little improvement, owing to the high cost of steel. Many contemplated improvements have been held up as a result. Should steel prices drop there would be a large amount of work done, and particularly in skyscraper construction.

"The dwelling and factory building business was especially good during the last half of the year, and particularly in the erection of homes for the working classes, some of the large corporations of the country making important improvements for the benefit of their workmen. Taken in its entirety, the large increase shown in residence and building construction has about offset the decrease in the erection of larger buildings. The outlook for this class of work for 1917 is most promising.

◆

## 1916 A BONUS YEAR

Due to the wondrously prosperous year just passed, more business houses gave employees bonuses than at any other time in the history of the country. Were it possible to sum up the money thus distributed it would mount to many millions.

Prompted by satisfactory earnings and the splendid service rendered by its employees, the Johns-Manville Company gave every employee working a year or more a welcome Christmas greeting in the shape of a bonus equal to 10 per cent of the year's salary. President T. F. Manville signed the notices announcing the Board of Directors' decision regarding the gifts.

◆

## NEW LITERATURE ON CONCRETE

The Portland Cement Association has issued three booklets on important phases of concrete work. They are entitled "That Alley of Yours," which states that nearly 200 cities, towns and villages in thirty-eight States have improved the appearance and service of their alleys with concrete. "Concrete Houses and Why to Build Them" pictures what has been done in this field and offers many good suggestions. "Concreting in Cold Weather" covers a lot upon the subject, in sixteen pages, telling what to do and what not to do, and should be of constructive service to concrete men doing general work.

◆

*He who doesn't like bachelor quarters can change them for a better half.*

◆

*He who won't see the light of truth stands in his own light.*

◆

Heyburn Brick & Tile Company, Boise, Idaho, incorporated with capital stock of $10,000 by L. St. Clair, H. G., V. T., and Joseph Pullman.

◆

The other illustration is of a joint exhibit of Fisher & Jirouch Company, decorative sculptors, Cleveland, and the Sandusky Cement Company, at the recent Industrial Exposition and Fair, Cleveland. It consisted of art stone of Medusa Waterproofed White Portland Cement, and showed the possibilities of this material for both simple and elaborate ornamental work. Special designs in garden, conservatory and hall furniture were artistically wrought. Colors from pure white to vivid red can be secured.

◆

*A hold-up is an unnerving experience, whether it's "your life or your money," or sending excuses instead of shipments.*

◆

*Why not a special tax on every man who taxes our credulity?*

◆

*A fortune awaits the man who can plan and build a house that will shrink to a cottage on assessment day and then swell up again into a mansion*

◆

*A cat may have nine lives, but an unfounded rumor has 9,000.*

◆

*Jonah was the first submarine navigator.*

# *Looking Ahead!*

¶ Ninety-nine per cent. of all new building construction is not actually firesafe—

¶ —because proper fireproofing materials and protective devices are not purchased and properly employed.

¶ **CONSTRUCTION** is encouraging more stringent fire safety laws—bringing home to architects, owners and prospective builders a realization of the value of consistent firesafe materials—

¶ —developing a vast market for

CEMENT BRICK TERRA COTTA
GYPSUM STEEL HOLLOW METAL

METAL FURNITURE
FIREPROOF DOORS AND WINDOWS
FIRE SHUTTERS WIRE LATH

AUTOMATIC SPRINKLERS
CHEMICAL EXTINGUISHERS
FIRE ALARM SYSTEMS

This is ***your*** work and should be supported when your 1917 advertising schedule is laid out.

*The International* FIRESAFE *Building Publication*

# CONSTRUCTION

The *only* publication *exclusively* devoted to consistent, firesafe, building construction.

## BREAKS RECORD FOR CONCRETE CONSTRUCTION

Four months ago the Philadelphia block bounded by Eighteenth, Nineteenth, Noble and Hamilton streets contained 51 three-story tenement houses. To-day it is the site of building No. V-1790 of the Baldwin Locomotive Works, an eight-story, flat-slap reinforced concrete structure, 98 feet 6 inches by 396 feet 8 inches.

When it is known that the building is bounded by four narrow streets which had to be kept open for traffic during the period of construction, and that within 25 working days after the foundations were completed the concrete roof was poured, it may be appreciated that this broke all previous records for speedy factory construction.

The building was erected by the F. W. Mark Construction Company, Philadelphia and Cleveland. V. E. Winell was superintendent. Condrom Company, structural engineers, Chicago, prepared the complete design, and F. Jasperson, consulting engineer for the Baldwin Locomotive Company, was general supervisor over the design and construction.

◆

## H. W. JOHNS-MANVILLE CO. OPENS NEW BRANCH

The H. W. Johns-Manville Company has just opened a new branch office at Great Falls, Mont., on the fourth floor of the Ford Building, Room 418, in charge of J. H. Roe. With the opening of the Great Falls office the Johns-Manville Company increases the number of its branches to fifty-five.

This new branch is made necessary by rapidly increasing business in this territory. Great Falls, with its rapidly growing population of 38,000, is not only one of the greatest hydro power centers of the United States—almost rivaling Niagara Falls—but is known as one of the best wheat growing sections in the country, its wheat taking first prize at the Panama-Pacific Exposition.

◆

Interlocking Cement Stave Silo Company, incorporated by W. B. Anderson, Mrs. B. F. Spruce and Frank M. Shanklin. Capital stock $40,000.

## "WHEN YOU BUILD A HOME"

"When You Build a Home" is the title of one of the latest publications put out by the Hydraulic-Press Brick Company. This firm has achieved a national reputation for business literature of the highest class. No more attractive booklet on brick homes has ever been produced by any brick company than "When You Build a Home."

The booklet is entirely devoted to the subject of brick homes, the principal argument being that in every way, and especially in cost, the brick house is by many odds the safest and more economical investment. This premise is established in a convincing manner through the proper use of dependable statistics.

"Economy, Durability, Safety, Comfort, Beauty"—these are the qualifications to consider in planning the home. "Economy means very much more than a saving (or rather a skimping) on the *first outlay.*" Such a saving (?) is ever at the expense of *durability.*

If "safety first" means anything it means real safety from fire in considering the materials which be selected to build the home, that *safe* containing such precious contents as the mother and children. It is poor economy to build of burnable materials.

*Comfort* and *Beauty*, the one for those inside, the other for the outside world, are not possible where material is chosen which must be gone over, renovated, repaired, replaced every few years.

Other chapters are devoted to the *Economic Value of Beauty, Numerous Merits of Brick, Durability, Fire Safety, The Test of Insurance Risks, Comfort, The Question of Health, Beauty, Building for Investment, Comparative Costs, Useful Hints, etc.*, the entire booklet presenting a sane and logical appeal to he homebuilder. Every statement is backed up with facts.

Physically the booklet is all that could be desired. A soft-faced, heavy-stock paper is used. The text is printed in a light green ink, and a heavy type, well spaced, makes reading easy. Almost forty half-tone plates appear, printed in a rich dark brown ink, showing a considerable variety of photographs of residences constructed of "Hy-Tex" brick. The booklet should be in the hands of every architect and home builder. It is practical from cover to cover and may be obtained by applying to the Hydraulic-Press Brick Company, St. Louis, Mo.

◆

## ELIMINATING THE POSTAGE STAMP

There has lately been placed in service by several American firms with unusually heavy mailings a postage meter which, instead of affixing the usual postage stamps on mail matter, makes an impression in the upper right hand corner. The new postal meter performs several tasks, such as sealing, stamping, facing and counting approximately 250 pieces of mail matter per minute. The envelopes, unsealed and unstamped, are placed in a compartment of the machine much in the same manner as they would be placed in a box, the mechanism handling the envelopes automatically from that point. The stamping mechanism not only makes an impression on the envelopes, but also counts, the numbers appearing in a descending serial on top of the stamping meter. The meter is so made that its mechanism can only be adjusted by the post office authorities, who set it for the number of impressions the user has paid for. When that number of impressions is exhausted the meter automatically locks and no longer stamps mail matter, necessitating its return to the post office for readjustment. The elimination of loss through fire or theft, the reduction of handling costs both in the mailer's establishment and in the post office, and the expediting of outgoing mail are but a few of the advantages this system offers over the adhesive stamp method. The impressions are not canceled.—*Scientific American.*

◆

Kingston Pike Brick Co., Knoxville, Tenn., has bought the property of the Alexander A. Scott Co. for $84,999.97. Forty-three acres comprise the land attached to this plant.

Athens Brick & Tile Co., Athens, Tex., has been incorporated, with a capital stock of $65,000 to manufacture face brick and hollow tile. R. F. Williams is secretary and treasurer.

REYNOLDS

FIRE SAFE

APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS
TRADE MARK
H.M.R.
ESTABLISHED 1868

SHINGLES

TESTED by the Underwriters laboratories under their standard tests, Reynolds Shingles have proven themselves worthy of classification as fire preventatives.

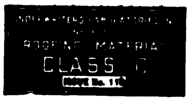
Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.

If your dealer cannot supply you write the factory.

**H. M. Reynolds Asphalt Shingle Co.**
**"Originators of the Asphalt Shingle"**
**Grand Rapids MICHIGAN**



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It's profitable, with accurate lists of prospects. Our catalogue contains vital information on Mail Advertising. Also prices and quantity on 6,000 national mailing lists, 99% guaranteed. Such as:

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| War Material Mfrs. | Wealthy Men |
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Write for this valuable reference book; also prices and samples of fac-simile letters.
*Have us write or revise your Sales Letters.*

Ross-Gould, 1001 Olive St.

**Ross-Gould**
**Mailing Lists St. Louis**

# If you are a Manufacturer *of* Firesafe Material or Protective Devices,

**consistent presentation—in season and out—of your product in CONSTRVCTION cannot fail to result favorably because the success of this publication depends upon**

**(1) how well it advances and proves the argument for proper fireproofing and**

**(2) what it actuall accomplishes to increase the use of firesafe materials and devices.**

**The first objective is attained (intensively) through the editorial, news and advertising sections of CONSTRVCTION and (extensively) by sending the magazine over the entire country to all the business and professional interests related to building planning, construction, equipment and maintenance.**

**The second purpose is accomplished by** ***actively fighting for legislation favoring firesafe construction*** **and against laws permitting the continued use of wood——and remember that no company can do this work as effectively as a publication, that the "fireproofing fraternity" at present is a composite unorganized body comprising a number of separate units representing more than a dozen industries, that there is practical need of a national mouthpiece such as you have in CONSTRVCTION, that** ***makers of fireproof materials are now getting but one per cent of the business which ought to be theirs,*** **that advertising in CONSTRVCTION is helping yourself to get more orders, giving your goods the representation they deserve—and according this publication the co-operation it merits.**

*She:* "If we must cut down expenses, why not drop your life insurance?"
*He:* "Not much. That's *your* insurance, not mine. I figure we can trim about all the other items so as to save at least $400 a year, and I'm going to take a hundred of that and buy another Postal policy while I can get it. You and the kiddies may be glad some day."
*She:* (thoughtfully) "I guess you're right at that, Jim."

Put Life Insurance in Your Family Budget —and Keep It There

THE *real* husband always makes a liberal allowance for life-insurance whether his wife wants him to or not, but the sensible woman *does* want him to when she considers it seriously.

And whether times are hard or easy they both want the most protection possible for their money, and hundreds of them during the last decade have therefore been turning to the

POSTAL LIFE INSURANCE COMPANY

The Postal employs no agents but issues its policies direct. Agents' commissions and office-expenses are thus saved and go to its policyholders.

It is not alone the Company of Safety and Service but also of Saving, for you will find net cost low—lower than ever before—because the Postal's actual underwriting experience has enabled it now to make a

**10%** reduction in premium rates with a continuance of the annual guaranteed dividend of **9½%**

***Besides these savings, the Company pays the usual contingent dividends, depending on earnings.***

If you are in good health you should take advantage of the 10% reduction in premium-rates and other Postal economies.

Find Out How Much *You* Can Save At Your Age

on any standard form of Policy—Whole-Life, Limited-Payment Life, Endowment, Joint Life, or on a Monthly Income Contract.

The Postal issues all of the standard forms, and operates under the strict supervision of the New York State Insurance Department and is subject to the United States Postal authorities.

To get exact figures for your age, simply fill out the coupon and mail today.

Remember: No agent will be sent to visit you. The Postal Life employs no agents; resultant commission-savings go to *you* because you deal *direct.*

POSTAL LIFE INSURANCE COMPANY
WM. R. MALONE PRESIDENT
THIRTY-FIVE NASSAU STREET NEW YORK

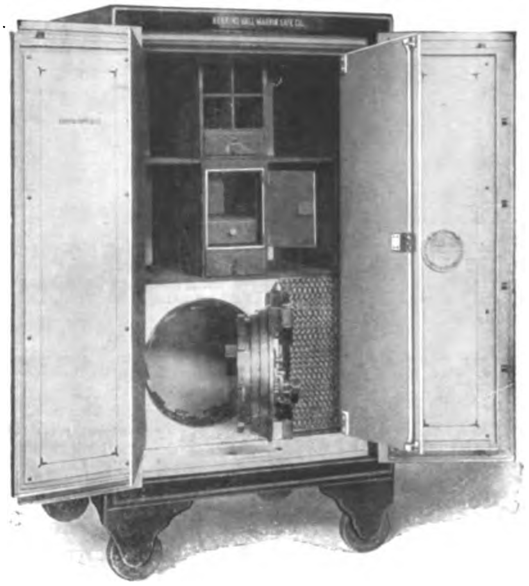
**Postal Life Insurance Company**
**35 Nassau St., N. Y.**

Without obligating me, please send full insurance particulars for my age.

*Name* ........................
*Address* ........................
........................
*Occupation* ........................
*Exact date of birth* ........................

HERRING-HALL-MARVIN SAFE COMPANY

*Designers and Manufacturers of*



Fireproof and Burglarproof

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*We offer the benefit of our experience of over seventy-five years in the manufacture of fire and theft-resisting safes and vaults and specially constructed Burglarproof equipments for Banks and Safe Deposit Companies.*

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In Word & Picture

**THE NATIONAL MAGAZINE OF DEVELOPMENT**

***LAND, HOME, FARM and FACTORY***

What is more important than to keep abreast of all developments which affect the immense Real Estate interests of the country!

***Call touring bureau for touring information and latest automobile maps***

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Do you know that REALTY'S circulation affords 100 per cent of prospects for you?

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Write for rates.

*Advertising Department*

**REALTY PUBLISHING COMPANY**

**220 West 42d Street, New York, N. Y.**

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REALTY

*every* month.

Send in your subscription *NOW*.

Just say, "Send me one year of REALTY. Enclosed find check for $2.50."

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**220 WEST 42nd STREET**

**NEW YORK, N. Y.**

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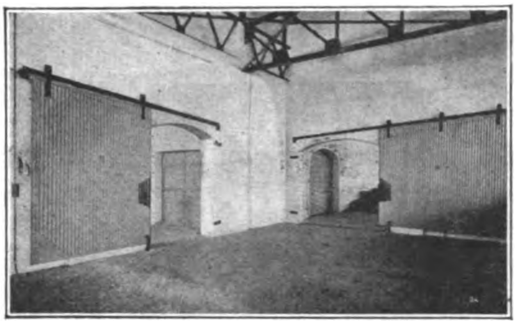
are the immediate result upon installing

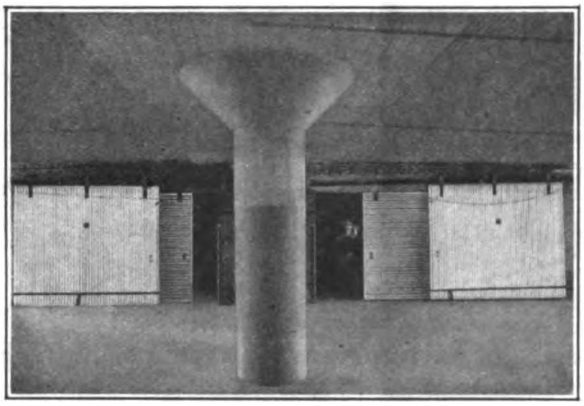
## EVANS "ALMETL"

## Fire Doors and Shutters

Pat. Pending



Wire Rope Works, Trenton, N. J.



Pennsylvania R. R. Freight Station, Philadelphia, Pa.

Of rigid, all-steel and asbestos construction. Light in weight, durable, cost nothing to maintain and secure the lowest insurance rates.

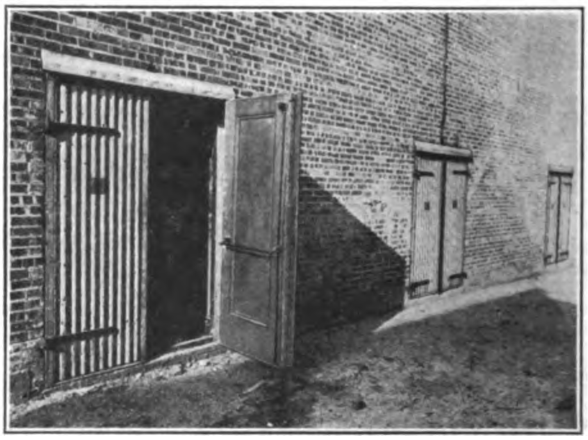
Standard equipment wherever safety is the first consideration.

***Approved***

By the Underwriters Laboratories, Chicago, Factory Mutual Laboratories, Boston, and state and municipal authorities throughout the country.

***Manufacturers of***

"Merchant's Old Method" Roofing Tin
Fire Retarding "Star" Ventilators
Merchant's Metal "Gothic" Shingles
Merchant's Metal "Spanish" Tiles



Installation showing addition of Metal Trim for Interior Finish

## MERCHANT & EVANS CO.

**PHILADELPHIA**

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*ATLANTA*
*CLEVELAND*

TRADE MARK M&E Co REG IN U S PAT OFF

*WHEELING*
*CHICAGO*
*ST. LOUIS*
*KANSAS CITY*

*The International* FIRESAFE *Building Publication*

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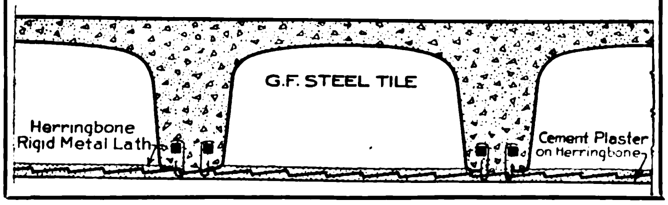

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# THE FIRESAFE

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APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS
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Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.

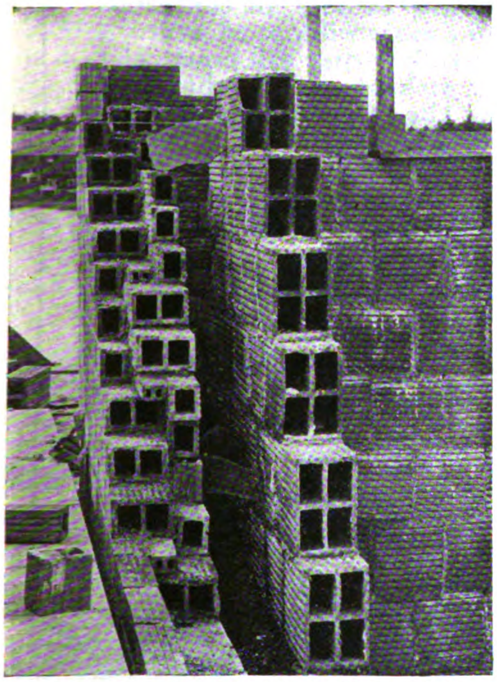
If your dealer cannot supply you write the factory,

**H. M. Reynolds Asphalt Shingle Co.**
**"Originators of the Asphalt Shingle"**
**Grand Rapids MICHIGAN**

# This Ice House Over 99% Efficient

## *The architects specified*

# NATCO·HOLLOW·TILE



*Ice House erected by Crystal Lake Ice Co., Newton Centre, Mass. Morton and West, Boston, Architects. McDonald and Kivell, Boston, Builders.*

*Approximately 100′ x 100′ x 40′ high; divided into three compartments by interior walls.*

*Outside walls 28″ thick, consisting of: 12″ outside section built of NATCO Hollow Tile, smooth on the outside; 8″ interior section of 8″ NATCO Hollow Tile, and 8″ air space between the two sections. This air space filled with ground cork up to approximately 30′ from ground, and above this height with sawdust.*

*Interior dividing walls of 8″ NATCO Hollow Tile built between Bethlehem girder beams 14′ on centers and for full height of building (40′).*

*Approximately 800 tons of NATCO Hollow Tile used.*

THE BUILDER'S GREAT PROBLEM in constructing ice houses is to provide thoroughly efficient insulation. Any melting, or "shrinkage," of the stored ice is a dead loss.

If there is melting at the bottom tiers of ice, the ice often tips and slides against the walls, causing bulges and frequently extensive damage.

The architects called in by the Crystal Lake Ice Company for its ice house planned and built during 1915 at Newton Centre, solved the problem with Natco—chosen in direct comparison with other materials.

The six air spaces in the 28-inch Natco wall insured such efficient insulation that the shrinkage was less than 1%, against the 5% expected.

WHEN THE FIRST COMPARTMENT WAS OPENED, the top tier showed no meltage, while the second tier showed "planer marks." Ice against side walls had melted only 4″ to 6″ next to the walls and for a depth of only 3′ from the top. The ice next to the interior division walls showed practically no meltage. In a *wooden* house, often a man can walk around between the ice and the outside walls when a pocket is opened.

In this Natco ice house there was no sliding of the ice. Not more than $10 was expended for repairs. Even this negligible damage probably was done in filling, the architects stated, and could have been avoided.

Here are the architects' arguments for Natco construction:—

**"This form of construction—while costing more than wood—has proved cheaper on account of: low maintenance cost; better suitability for storage; appearance; serviceability. It is superior to concrete because it is a better insulator against heat; and, as it is composed of small tile units, repairs are simple to make, where, in the case of concrete damaged, they would be very expensive.**

**"The first year of service for this house has been one of perfect satisfaction in all respects."**

Such successful uses for Natco extend still further the opportunities for architects who specify Natco. Send for full information from your nearest Natco office.

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***Other Offices:* New York Chicago Boston Detroit Philadelphia Washington Syracuse**
***23 factories in the United States***

**NATIONAL FIRE PROOFING COMPANY OF CANADA, Ltd.**
**Office at Toronto and Factory at Hamilton, Ontario, Canada**

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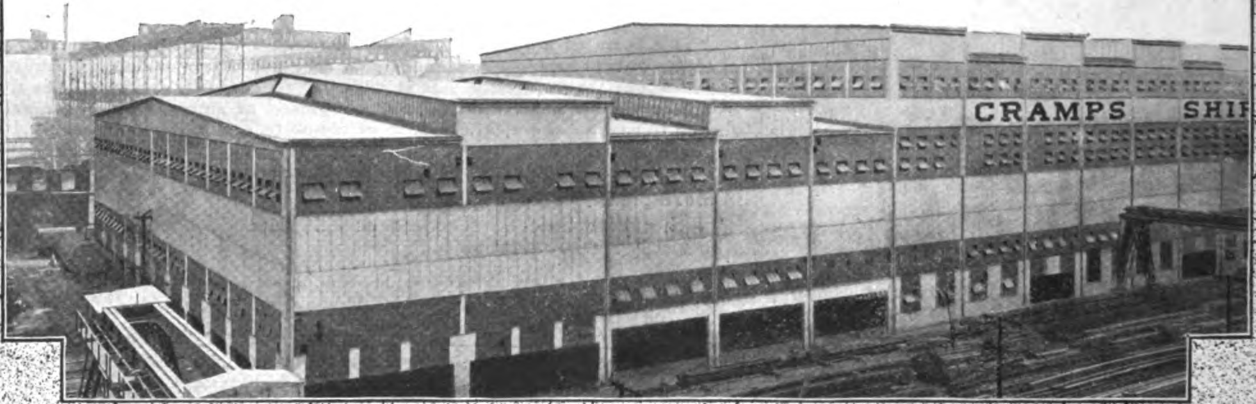


# CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. IV MARCH, 1917 No. 3

## Lumber Dealers and Building Codes

UNDER the caption "Wise Lumber Dealers Will Keep an Eye on Local Building Codes," the *American Lumberman,* in a late issue, offered the following sage advice to its readers:

"Spring building will produce the usual crop of building code revisions. Many of them will be honest in intent, but based on misapprehension and misinformation. Here is a responsibility that rests on the building material dealers of each community. Unhappy the community whose dealers are not organized and not working in common. The dealer who thinks he 'can go it alone' should see that here is one instance in which he cannot. The whole strength of the local building business must be brought to bear to save the consumer excessive and unnecessary cost, and the dealer unfair discrimination. The building code is a local symptom; community co-operation the local treatment. Perhaps it will serve a purpose in making the dealer see that he 'cannot go it alone' in the State and Nation any more than he can in matters immediately at home."

Those familiar with the drift of public sentiment throughout the country with respect to building affairs will appreciate that the organ quoted above, fearing that every intelligently undertaken code revision will strike a body blow at the too free use of lumber in construction, is quite content to have local legislation remain as it is, and would have lumber dealers everywhere co-operate to that end, unless, indeed, through aggressive effort they may succeed in undoing some of the wise legislation already enacted.

By combining forces and gaining the aid of State and National lumber interests the local lumber men of Birmingham, Ala., managed to have annulled the anti-wood shingle ordinance which had proven so helpful in reducing the city's fire loss, and they are now hard at work to the same end at Montgomery, Ala. At Boston, where close and intelligent study has been given the community fire hazard, the area in which the use of lumber as a building material cannot be used was extended far beyond the former limits a couple of years ago, and the authorities are now insisting that the safety zone be still further enlarged. No wonder lumbermen fear the "usual crop of building code revisions" and their chief organ urges local dealers to "organize and work in common."

Manufacturers of and dealers in fire-resistive building materials would do well to get together everywhere and fight for the common cause—the reducing of the great annual fire waste of the country. If the campaign was conducted with one-half the energy shown by the lumber people the demand for fire-resistive products would soon be several hundredfold what it is at the present time, and the economic drain upon our people through constant burning of their property would shrink to modest proportions.

## Pittsburgh Penalized for Its Fire Danger

HON. JOSEPH G. ARMSTRONG, mayor of Pittsburgh, and W. E. Mallalieu, general agent of the National Board of Fire Underwriters, are in sharp conflict over the fire hazard of the Smoky City and the methods employed to combat it.

Following the recent severe fire in the business district of Pittsburgh, Mr. Mallalieu declared that the dangerous condition of the burned structures had been pointed out by the underwriters fully eighteen months ago and the installation of fire doors, enclosed stairways, automatic sprinklers and other fire prevention and extinguishing devices strongly urged. Failure to comply with the recommendations in question, coupled with an undermanned fire department, in the opinion of the National Board's general agent, was responsible for the conflagration experienced early in the present year.

While Mayor Armstrong denies Mr. Mallalieu's allegations, the latter sticks to his text, not hesitating to "reassert that Pittsburgh is inviting grave danger by continuing a state of affairs that appears little short of deplorable."

As to the effect existing conditions have upon the premium payers of the city, General Agent Mallalieu asserts that insurance rates in Pittsburgh are far higher than would be the case if the city did not present such large elements of hazard. It is the practice of underwriters to proportion their rates as accurately as possible to the risk involved, and if Pittsburgh's risks were lessened its rates would be lessened. This action would be quite voluntary and almost automatic on the part of the insurance companies; but even if there was no unwillingness on their part, the anti-discriminatory features of Pennsylvania's insurance laws would compel such action.

Pittsburgh's premium payers are thus expending great sums of money in premiums that are compelled to be higher than should be the case. The remedy would appear to be in their own hands.

## Fire Menace of Frame Construction

CONSIDERABLE frame construction in the mercantile section of Hagerstown, Md., constitute a serious fire menace to the city, according to the report of the engineers of the National Board of Fire Underwriters. While the structures are of moderate height, the fact that they range close to one another makes for the rapid spread of the flames, once fire is under good headway. A further serious fire menace, pointed out by the engineers, is the accumulation of rubbish in many of the properties, a danger always to be feared in mercantile districts.

The folly of allowing frame buildings in the heart of their city having been pointed out to the Hagerstown authorities, they should lose no time in barring the erection of further structures of this type and, in so far as is possible, compelling the covering of those now existing with fire-resisting materials.

## Increase in Philadelphia's Fire Loss

DESPITE the activity of Fire Marshal George W. Elliott and a staff of efficient assistants, the fire loss of Philadelphia during 1916 was greater than it had been during the preceding twelve months, and an increase over the average annual loss of the city for the past decade. The 5,521 fires occurring in 1916 resulted in an aggregate loss of $2,738,950.

Mr. Elliott frankly admits that the great increase in the loss figures of 1916 "cannot clearly be accounted for, as many things, such as the increased number of buildings, increase in population," are factors in the result. His conclusion is that "the large total simply implies the continued presence of the fire menace and the fire in our city, in common with other cities."

That "other cities" suffer severely from fire will afford little consolation to the good people of Philadelphia when they appreciate that the charge imposed upon them in this connection during the year ended December 31, last, was $1.57 per capita.

The noteworthy feature in connection with the interesting report of the fire marshal when studied in detail is the needlessness of the percentage of the fires. Had intelligent care been exercised in the construction of the property, modern and comparatively inexpensive devices been supplied to deal with incipient blazes, and the premises kept free from fire-breeding rubbish, the loss record of the City of Brotherly Love would not have been one residents of the community and the governing officials would have felt called to apologize for.

## Flying Brand Hazard at Newport R. I.

NEWPORT, R. I., famous as a Government naval station and as a summer resort for the ultra-fashionable, is, in the opinion of insurance engineers, liable to serious fires, both in the mercantile and in the compactly-built residential sections. With but few exceptions the mercantile structures of the city are none too substantially built and would offer little resistance to a sweeping fire. The streets, too, are narrow, hampering the work of the firemen. In the older residential districts wood-shingle roofs invite ignition from flying brands, and under easily-imagined conditions might cause a conflagration that would destroy a good part of the community. While it is perhaps too much to suggest that the streets be widened, thus reducing the exposure menace, the further prohibition of the dangerous wood-shingle roof might easily be brought about, and such action should at once be enforced by the proper authorities.

## Adjoining Building Hazard

FIRE MARSHAL O'BRIEN, of South Dakota, reports the fire loss in his State for the month of January last as $46,855. Of this sum $12,250, or more than 25 per cent, resulted from fires originating in adjoining buildings. South Dakota is an agricultural State and its residential properties are not so close to one another as is the case in the more thickly populated Eastern and Middle Western States. Despite this fact, one-quarter of the January fire loss was caused by exposure, demonstrating the care that should be exercised in building a home to safeguard it, not alone from interior fire, but from that which may be communicated from adjoining properties. Especially should the roof be of incombustible material, for flying brands often travel great distances and constitute the most severe single fire hazard in the country.

## The Second National Complete Building Exposition

The Second National Complete Building Exposition, which has just closed a most successful week at the Grand Central Palace, New York City, offers to manufacturers a distinct lesson in the value of direct publicity.

From early afternoon to late at night the Palace was open to an interested audience of property owners, prospective builders, architects, engineers and contractors. Many attractive exhibits of lumber, stone, flooring, cement, machinery, automatic sprinklers and other building materials and equipment devices filled the main floor, an unfortunate condition of freight tieups holding back the exhibits of many others.

Generally speaking, fire-resistive materials and protective devices were decidedly conspicuous by their absence. Clay products, brick, tile, etc., were nowhere in evidence, with the exception of one small but attractive exhibit: cement, gypsum, metal lath, marble, chemical extinguishers, wire glass, metal doors and trim, fire hose and equipment, and similar products went practically unrepresented, and the industries involved should seriously consider the loss of business and of prestige resulting from such lax conditions.

We understand that the management of the Building Exposition plans such an exposition as a feature every year in New York City. If such general industries as the automobile business, motor boats, hotels, flowers, South American products and others can maintain attractive annual exhibits, surely the greatest of all industries, that of building construction, should do so. The value of such constructive publicity is immeasurable and the direct returns to the individual manufacturer should result in making next year's show one of magnitude and national interest.

## CONSTRVCTION Becomes the Official Organ of the National Fire Resistance Council

On other pages of this issue will be found a full explanation of the origin, plan and purpose of the National Fire-Resistance Council, of which CONSTRVCTION is now the official organ to report all activities and progress of this organization.

For years the manufacturers of fireproofing materials and protective devices have produced and sold under difficult conditions, and the users of such materials have also been materially hampered, by varying building code and insurance demands, by a lack of knowledge on the part of the building public as to what constitutes firesafe construction, by a lack of model building codes, of standard specifications, and a serious lack of co-operative effort on their own behalf.

The N. F. R. C. is a body of such manufacturers and users, which is being strongly organized for the purpose of clearing up existing difficulties and to avoid a great amount of useless and duplicated effort on the part of individuals or manufacturers' class associations.

The address of this organization will be found on the back cover of this publication, and all manufacturers of unburnable or fire-retardant materials, all *sensible* manufacturers and producers of wood and lumber products, all manufacturers and vendors of fire-protective devices, and all contractors and engineers or architects interested in the use of such materials are strongly advised to communicate with the association in order that they may assist in this, the greatest effort ever conceived by manufacturers and users of permanent materials which has as its logical outcome a broadening of their market by directly benefiting public welfare and bringing about a natural and much-needed reduction of the national fire waste.

## New Commissioner for Associated Metal Lath Manufacturers

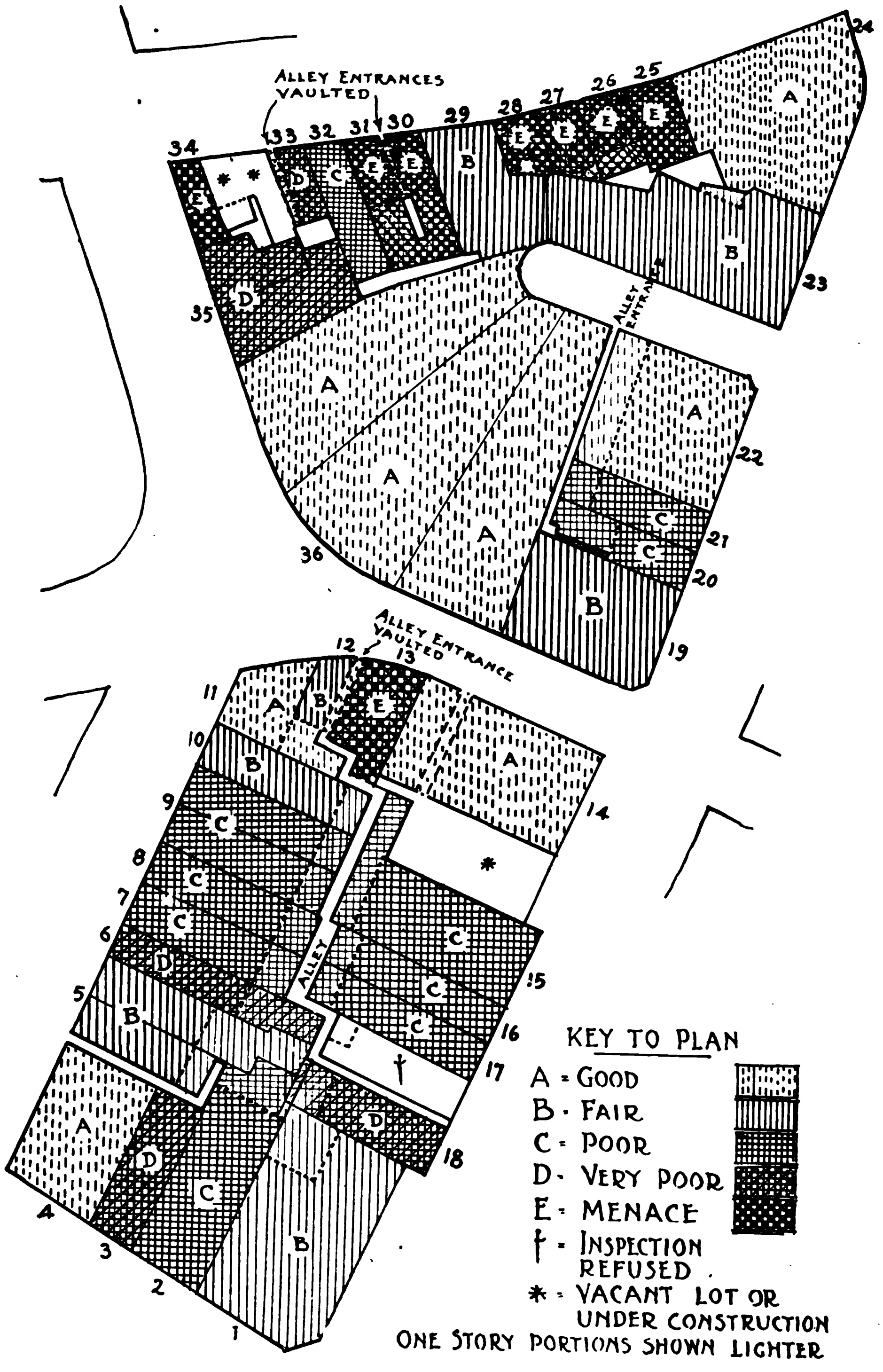
ANNOUNCEMENT has just been made by the Publicity Bureau of the Associated Metal Lath Manufacturers that their offices have been moved from Chicago to Room 901, Swetland Building, Cleveland, Ohio, and that Zenas W. Carter, formerly of Boston, has been appointed Commissioner, to supervise all their publicity, promotion and investigation from the Cleveland office.

Mr. Zenas W. Carter has been manager for manufacturers' associations for the past ten years, directing co-operative publicity and promotion work between manufacturers, distributors and consumers. He was the first General Secretary of the Electric Development Association when it was incorporated in New England, and he has managed the publicity and field promotion work of the Granite Paving Block Manufacturers' Association of the United States since their organization, two and one-half years ago.

Among the plans of the Metal Lath Association, which are yet in the embryo, is a co-operative national campaign of publicity which will be developed by the Council of Advertising Managers of the member companies, which Council is an active part of the Publicity Bureau of the manufacturers' organization, although the Publicity Bureau proper includes officials and sales managers of the companies interested. Their plans cover a series of extensive and exhaustive tests of the fire resistance properties of metal lath, its use in fire-retarding construction, the exploitation to architects and the public of the saving in space which can be effected through the use of this material, its vermin and rodent proofness; investigation and assistance in the revision of building codes of cities so that metal lath will receive its proper recognition by city officials and engineers, and a co-operative movement in the distributing centers of the United States seeking to develop co-operative promotion work on the part of the jobbers and large distributors of metal lath.

The advertising managers who comprise the Advertising Council of the Publicity Bureau of the Associated Metal Lath Association are: Mr. C. O. Powell (president), Northwestern Expanded Metal Company; Mr. S. E. Fechheimer, Trussed Concrete Steel Company; Mr. R. M. Nicholson, Berger Manufacturing Company; Mr. C. M. Stewart, Consolidated Expanded Metal Companies; Mr. L. E. Fisher, General Fireproofing Company; Mr. L. J. Rouleau, Penn Metal Company; Mr. F. E. Ericksen, Milwaukee Corrugating Company; Mr. William George Lane (secretary), The Bostwick Steel Lath Company; Mr. Zenas W. Carter, commissioner.

The Julian Armstrong Bureau of Related Industries will continue its special work for the Associated Metal Lath Manufacturers, and Mr. Walter L. Weeden, of Worcester, Mass., has succeeded Mr. Carter as field secretary of the Granite Paving Block Manufacturers' Association of Boston.

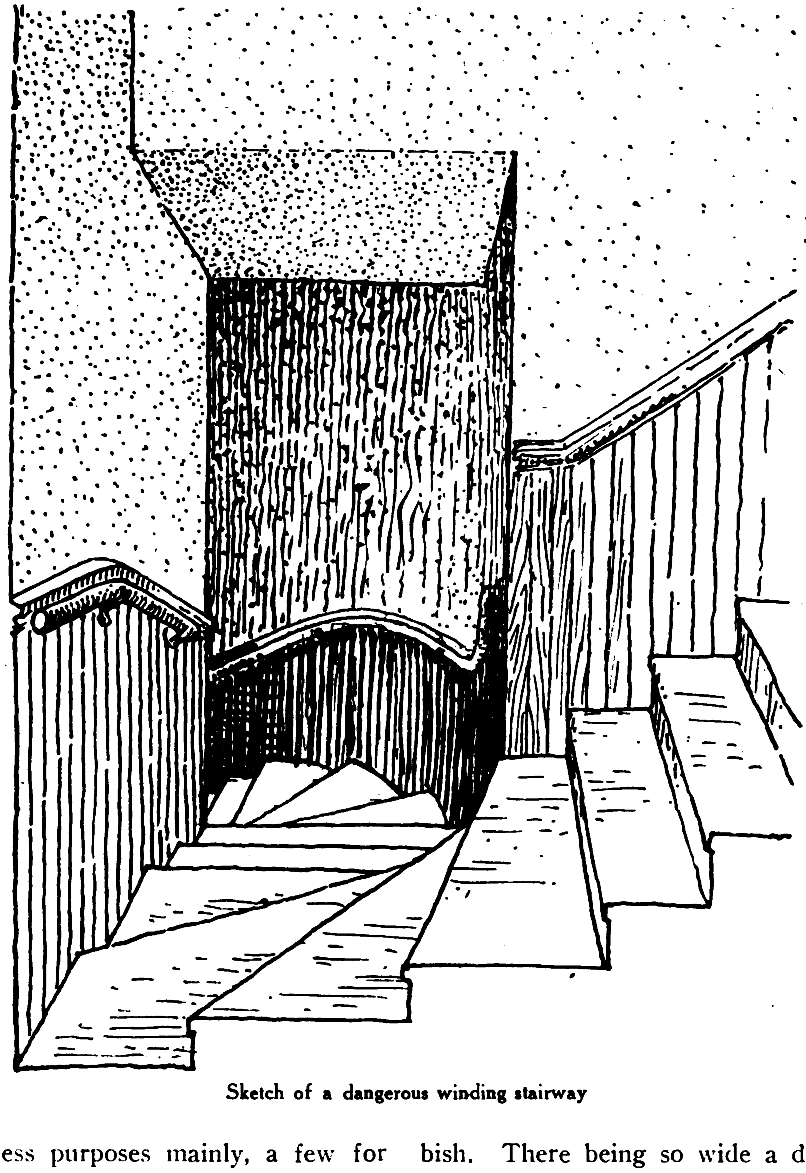


# A Study of Fire Risks in a Business Section of Boston

By Mary C. Wiggin, *Executive Secretary,* and Dorothy A. Baldwin, *Assistant Secretary*

This interesting study of fire risks in one of our largest cities is the result of careful investigation made by two Wellesley alumnæ and is published through the courtesy of the Consumers League of Massachusetts. Although the particular risks described are located in Boston, the type is common in every American city, and the results of this serious and praiseworthy investigation should be studied by every person interested in municipal improvements and the reduction of our serious national fire waste.—Editor

THE Consumers' League has long been aware of the inadequate protection against fire in the crowded business districts of Boston. In order to lead the public to share our apprehension and to join with us in some effort to improve conditions, we are presenting this study of fire conditions in two blocks in the heart of the city, chosen under the guidance of the Boston Board of Fire Underwriters as typical in general construction and in the variety of industries represented. The buildings are of moderate height, five stories in almost every case. The two highest, eleven stories, are modern in construction and equipment, though not perfect: one, an office building, lacking an absolutely fireproof stairway; the other giving access to its fire escape on each floor through a public hall Most of the buildings were erected years ago, for business purposes mainly, a few for dwelling houses. One great difficulty in safeguarding them is the constant change of business from factory to stock rooms, salesrooms, restaurants or even saloons, each trade bringing its own peculiar risk.



Sketch of a dangerous winding stairway

Preliminary visits with a chief of the City Fire Department emphasized for us the features most important in fire protection. With this preparation we were ready for the systematic study of the district, going from roof to basement in each building with an inspector loaned to us through the kindness of the Board of Fire Underwriters. All risks and preventive measures were carefully recorded, and from these records we were able to grade the various buildings for the plan on the opposite page.

## Good Construction Fundamental

In our scheme of grading, seven points were given to faults in construction, as of exits, halls, stairways, elevators; two points to lack of protective appliances, as of fire alarms and sprinklers; one point to faults due to occupancy, such as blocked aisles and accumulations of rubbish. There being so wide a divergence of opinion among fire experts as to the emphasis to be laid on these points we felt ourselves free to choose. To us good construction seemed fundamental, rendering means of fire extinguishment less essential, although of great importance. To lay much stress upon faults due to occupancy seemed unfair, since both tenants and their conditions are so constantly changing.

Our map looks discouragingly black, ten of the thirty-six buildings being classed as poor, with thirteen above that grade and thirteen below. The blackness of the map is in the main due to some fault in the means of egress. Boston's building law requires "reasonable means of egress satisfactory to the Building Commissioner." This affords good protection in new buildings, but the inspection force under this department is much too meagre to set a high standard for old buildings. The most desirable exit for a factory worker would be to the next building through a fire door in a fireproof wall. Five buildings provided such doors on each floor; two more made such provision, but through an elevator shaft, rendering the exit available at best at only one floor at a time. Four provided the fire door on but one floor; one on the third floor in a six-story building; two on the fourth floor in four and five-story buildings; the last on the fifth floor to a storeroom with stairway closed, the exit provided being over the roofs.

## Fire Tower Valuable

The fire tower is another dependable means of escape, as it is not only protected from fire and smoke by fireproof doors and walls, but is permanently open to the outer air, so that if smoke should enter, it would be carried off instead of choking the stairway. Boston has few fire towers, but our building law does provide that "hereafter in any factory . . . or workshop built or altered, of second-class construction, where ten or more persons are employed above the second floor, one exit shall consist of a fireproof stairway enclosed in incombustible material." This provision is especially important in the block studied, since twenty-eight out of the thirty-six buildings had but one stairway; in only two cases was this fireproof. Of the few buildings having more than one stairway, one had both flights fireproof, a second had but one fireproof, while the rest were without such protection.

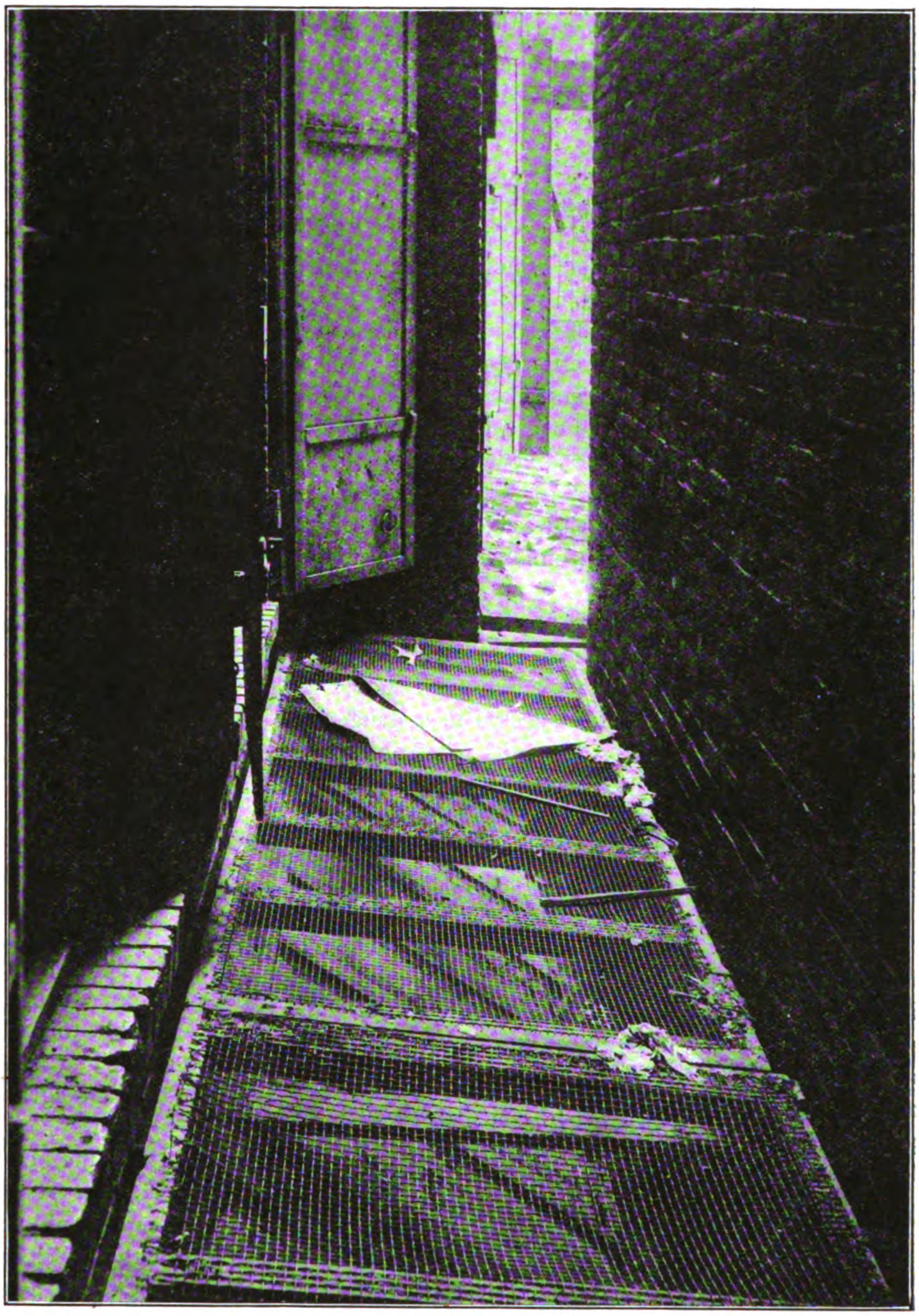
The non-fireproof stairways often presented additional risks. In eight cases the lighting was poor; in twenty-one there were winding stairs; in one, shown in the cut opposite, the stairs made two turns at right angles, first to the right, then, after a few more steps, to the left, the hand rail being so placed as to offer little or no support at the dangerous corners. In eight cases there were narrow stairs less than thirty-six inches wide, in one case the second flight being but twenty-one inches in width at the narrowest point.

Of our thirty-six buildings, seventeen had no passenger elevator, though in six of these there were freight elevators. The latter are of little use, as there is seldom definite provision for running them in case of fire. Fifteen of the seventeen passenger elevators found were in the same well with the stairs, and in only one such case was the well fireproof. In but three cases was there an elevator with fireproof enclosure separate from the stairway. This construction is very faulty, with the stairs in the same well with the elevator and often winding around it. A fire starting in the lower floors of a building will usually spread upwards by means of the stairway, elevator shaft, or any such opening affording draft and a comparatively unobstructed passage. It is obviously far safer to have the stairs and elevator in entirely separate enclosures, in order that both may not be rendered useless at the same time. Of course, this danger is diminished if, even though in the same opening, the stairs and elevator as well as the walls around them are built of incombustible material, or if the elevator at least is made fireproof and is run in a brick or steel shaft with fireproof doors. The importance of having stairways and elevators made fireproof cannot be over-emphasized, and it is possible so to enclose them even in old buildings. Unless such provision be made, although the fire may be in an entirely different part of the building, the smoke will usually make the stairs impassable and the elevator useless.

Boston permits the outside fire escape as one of the two means of egress required on each floor. The New York Labor Department does not count the ordinary outside fire escape in estimating the occupancy allowed on each floor. A chief of the Boston Fire Department characterized them to us as "grills on which over and over again workers have been roasted to death in trying to escape from a burning building"; in fact any one who has had much experience with fires gives the same verdict.

In the blocks studied, twenty-nine buildings had one fire escape; two had two each; the other five had no escape, but had in each instance two stairways. Twelve escapes were of the balcony type, with no steps down to the street, but leading to the windows of the next building. These are a safe type, provided that the fire shutters are not closed, thus preventing entrance to the next building. The remaining escapes were of the ordinary stair type, passing in their descent window openings through which flames would burst out in case of fire; in but two cases were they safe because they passed blank walls or windows with wired glass. Twelve ended with a perpendicular ladder leading to the ground, six stopped at the second story, with nothing leading to the ground; in three cases they even ended on the roof over the first story in a blind area; that is, in a space between buildings, with no suitable outlet to the street. In one case the outside escape from the fourth floor down was a spiral stairway of the same type as the interior stairway shown in the illustration on page 111.

Most of the escapes were fairly accessible from within, though only two were really good in this respect. To avoid the danger of falling when one gets out on the fire escape, the exit from the building to the escape should be by a door on a level with the floor, and the balcony of the escape should also be on the same level; in only one instance did we find it so arranged. In one building there was a low window-sill leading to the escape; in all other cases there were difficulties in the way, such as high window ledges, or machines and tables so arranged as to make access to the fire escape difficult. In one building we found not only a high window ledge, but on one floor a box-like structure some three feet wide built into the hall directly beneath the window to the fire escape. As this was of the same height as the window and had a steep sloping top, it made it practically impossible to reach the escape on that floor except through a side room which might be closed or cut off by fire. In the same building all who did make their way down by the escape to the second floor would be landed in the space shown in the illustration on this page. A ragged old wire screen over a glass skylight leads through the opening to a similar screen, very narrow, with a steep fall to the alley on the right; on the left is a possible entrance to the adjacent building through the window whose fire shutter appears dimly in the background.



Exit from fire escape, showing wire flooring over skylight

The buildings found so faulty in construction should certainly have excellent protection against fire. Those experienced in fires and fire-fighting agree for the most part that by far the best protection is afforded by the automatic sprinkler system. The Fire Prevention Commissioner has the power to order sprinklers installed in buildings in the Metropolitan District, and has done good work in this respect, but is limited in not being able to order them where they would cost more than 15 per cent of the value of the building. This means that in many cases where sprinklers are urgently needed throughout the building it may be possible to order them installed only in the basement. This offers no protection against fires starting above the basement. Another obstacle to his work is that where the street has been recently paved permission is often refused to tear up the street to connect the pipes for the sprinkler system ordered by him. Of the buildings in our blocks twenty-five were without sprinklers or extinguishers, relying only upon pails supposedly filled with water, but frequently found empty or half filled in a building without janitor service. Six had automatic sprinklers, although one of these had them only in the basement; four had chemical extinguishers also, four more had extinguishers but no sprinklers. In connection with the automatic sprinklers there is always an automatic alarm system which acts under the same circumstances as the sprinklers, notifying the fire department of the location of the fire. We found this alarm system in thirteen out of the thirty-six buildings visited, but not in a single instance did we find an inside gong to notify the workers in the building.

### Exits Not Marked

Exits were seldom marked and fire drills had not been organized in any of the buildings. Either the Fire Prevention Commissioner or the City Fire Department will organize fire drills upon request, but there is no law in Massachusetts requiring such drills, as there is in New York, Pennsylvania, New Jersey and in some of the other manufacturing States. Experts agree that the fire drill is a very important factor wherever there are a number of workers, as by this means they become thoroughly accustomed to the various means of exit and to prompt action in obedience to orders.

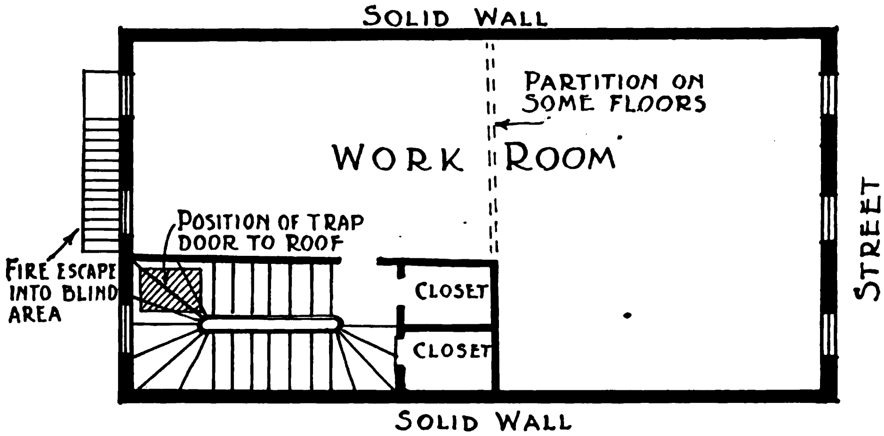
The tenancy risks were apparently not very serious. There was little dangerous trade; only a few restaurants, various saloons, and one or two paint shops. In a few instances rubbish had collected in a dangerous way, and in a number of cases exits to escapes were blocked by machinery, the floor space was crowded by boxes, chairs and tables, and the number of workers was out of all proportion to the size of the room. These conditions occurred most frequently in the most obvious traps.

One of the worst tenancy risks we found was in a five-story building of none too good construction, having unprotected wooden stairs, and no elevators, but with a balcony fire escape on each floor leading to the next building. There was an automatic alarm system, and sprinklers had been ordered, though at the time pails of water were the only means of extinguishing fire. On the two top floors were about one hundred workers of an unusually low type for factory workers, unintelligent and excitable. On the fourth floor, where conditions were the worst, there were about sixty of these foreign women, far too many for the space, and, in addition, the floor was much crowded by machines and tables. On this floor a very high table completely blocked the window to the fire escape, and the stairs, which were winding and stood out into the workroom, were piled up all along their widest side with great bolts of flannelette. The fuzz from the flannelette was everywhere, rolling in balls about the floor, accumulating in all the corners, festooning the walls and ceiling, thus affording the best possible means for spreading a fire like lightning from one end of the building to the other.

Without doubt most fires are entirely unnecessary, due largely to carelessness. If property owners would take suitable precautions as to proper construction and the installation of sprinklers where necessary, and would obey the fire ordinances, fires would be very infrequent. The Supreme Court in New York has recently upheld Fire Commissioner Adamson of New York City in ruling that anyone upon whose premises a fire occurs must pay to the Fire Department the cost of putting out the fire, if in that building there has been any failure to comply with orders from the Fire Department or to obey city regulations in regard to fire. Cleveland, Ohio, and the State of Pennsylvania already have similar laws. Some such ruling should certainly be adopted in all our large cities as the only effective means of insuring a reduction in the number of fires.

We have now covered the various points considered in rating our buildings as varying from "good" through various stages to "a menace." Let us consider in detail a few buildings marked on our map as "menaces."

No. 26 is an old five-story building, looking fairly respectable as one enters, with its brick front and its flight of marble steps, wide enough, though a bit winding at the top. Above the first flight is no more marble, only plain wooden stairs in a lathe and plaster stairwell, not at all fireproof. The upper flights were very winding, and from the top floor a steep ladder-like stairway led to a trap-door opening in the roof. Where the next roofs are on the same level, as in this case, the roof usually forms a fairly good means of escape, but this particular trap door was placed directly over the stairs, as shown in the floor plan on page 9, and by opening the trap door a draft would be created which would draw the fire quickly up the stairs. Moreover, the trap door stuck so hard that our friend, the inspector, was able to open it only just enough for us to crawl out. The fire escape shown in the right-hand corner of the diagram was one of the usual grills and led down to the roof of a second-floor ell, with flooring of the same heavy wire over a skylight as is pictured on page 7. The wire netting was decidedly springy and would not be likely to hold many at once, but by hugging close to the blank wall opposite one could walk along a strip of solid tin roof about a foot wide, only to find on reaching the gravel roof that there was no escape to the street except through two blocked windows, or through a door opening into a shop on the second floor of the next building. At the time of the investigation the door was unlocked, but that was no proof that it would always be so. In any event, a fire which had gained much headway in those old buildings would make a veritable furnace of that little triangular area between brick walls. At our first visit the upper floors of this building were badly overcrowded with workers, mostly girls; at a later visit the factories were not busy and had fewer workers. The map on page 2 shows clearly the position of this blind area at the back of buildings 25, 26, and 27.



PLAN OF OLD BUILDING WITH FIRE ESCAPE LEADING INTO BLIND AREA

The row of buildings, from No. 25 through 28, were old dwelling-houses, heated by stoves, and presenting most of the features described in connection with No. 26. No. 28 did not open on the blind area, but the exits to the fire escape were blocked by machines.

No. 13 presents a menace of a different nature: it is a modern building of second-class construction, with good, light, solid stairs of adequate width and not winding; everything, in fact, seemed in good repair and well cared for. It was a six-story building with a saloon and restaurant on the first floor; the stairs were of wood, without fireproof enclosure; the non-fireproof elevator ran up directly beside them; there was no outside fire escape except from a balcony outside the hall window of the sixth floor. Here at right angles to the outside wall a perpendicular ladder without rails led to the roof above. We began to look about for other means of escape. The picture on the preceding page, taken by flashlight on the second floor of the building, will show what we found. Imagine racing down a spiral stairway like that, from the sixth floor to the second, where the stairway ended abruptly in absolute darkness, for the light from the skylight in the roof over it was not strong enough to reach to the bottom. The means of escape from this trap was either back into the building or through a fire shutter to the outside, but at the time of our visit the shutter stuck so fast that it refused to open even for a man. On the outside, as we saw from the alley afterwards, was a rusty grilled balcony from which an equally rusty ladder led down the wall to the alley. Even this poor equipment would be obviously of no use if it could not be reached. The possibilities of a fire panic in such a place as that are too horrible to imagine. As the inspector said, the hope was that no one knew of the existence of this stairway. The building was not crowded by workers, but there were sixty or seventy-five above the first floor. There was no alarm in the building, and the only means of extinguishing fire was some half-filled pails. On the third floor there was a fire door through the brick wall into an adjoining building, but this was by no means adequate escape for all in the building.

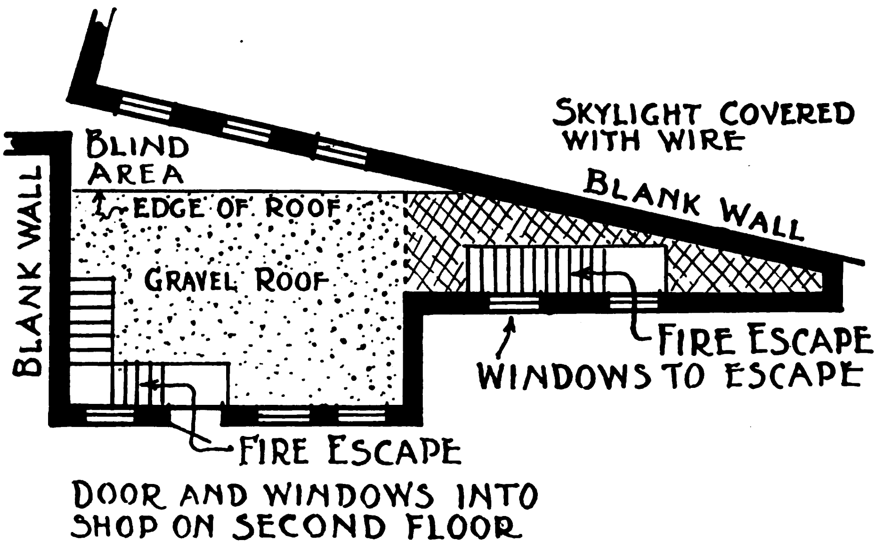


DIAGRAM OF BLIND AREA ENDING FOR FIRE ESCAPES. WINDOWS BEYOND EDGE OF ROOF TOO FAR AWAY TO BE REACHED WITHOUT DANGER OF FALLING TO GROUND BELOW.

Such were the conditions which we found in our blocks, selected as typical of hundreds of others where men and women are working in deadly peril in case of fire. Is our State fixing clearly the responsibility for such menaces, or are we waiting to be driven by such terrible tragedies as have impelled other States to more adequate prevention.

When the investigators of the Consumers' League try to report to the proper authorities such conditions as are described above they find themselves quite bewildered by the multiplicity of Boards responsible, and this in spite of our years of experience in such matters. First of all, for Boston there is the City Building Department, which has to do with the structure of buildings, the number and kind of exits, and matters of that sort. The Commissioner can enforce orders by legal procedure if necessary. He told us that he welcomes complaints of bad conditions and gives all the time of his inspectors to following up such complaints, having none left for the very important work of inspection by districts. Thus in the absence of sufficient inspectors, much depends upon the public-spirited citizens who are willing to take it upon themselves to notice and to report unsafe conditions.

Outside of the city limits the State District Police has the same duties as has the Building Commission within the city, winding stairways, unsafe elevators, faulty fire escapes, clearly come under the jurisdiction of one of these boards. But if halls are blocked with boxes, or access to escapes is cut off by machinery or high window-ledges, or wiring over the window frames, or by the box-like structure described on page 6, who should remedy this? The Building Commission? or the State District Police? or the city police? or the Boston Fire Department? or the Board of Labor and Industries, commonly held responsible for factory inspection? And who should attend to those empty fire buckets? We are never quite sure where to fix the responsibility.

And so we turn to the Fire Prevention Commission, established in 1914, a body supposed to keep a general oversight over fire conditions, but without inspectors. It must depends upon reports from the City Fire Department, which is already overburdened with the work of fighting the city's innumerable fires.

Perhaps the most careful and regular inspection as to fire hazards is made under the Boston Board of Fire Underwriters, which recommends to the insurance companies the increasing of rates where risks are found: a most effective means of inducing the correction of evils. Until recently the Underwriters did not lay much emphasis on adequate means of exit when making their rates, as they were chiefly concerned with the protection of property against fire. They have learned, however, that no fireman will begin to save property until all the people are out of the building, and for this reason the Underwriters are now considering more carefully the means of escape.

We find in our city and State at least seven different bodies with more or less responsibility for fire risks: the Building Commission, the District Police, the Board of Labor and Industries, the city fire department, the Fire Prevention Commission, and the Board of Fire Underwriters: also the Schoolhouse Commission has authority for school buildings, the city police for fire dangers due to overcrowding, etc., in theatres. Some of these bodies have inspectors but little authority, others have authority but no inspectors: one has no legal standing, but appeals to the desire to keep insurance rates low. Such division of authority is most confusing to an interested public; it is most wasteful of public funds, since each board should attempt supervision of each building; it is most inefficient, because there is no attempt to give each board an adequate inspection force; it is most unjust to the business man, who must meet the conflicting demands of all these boards. The following up of complaints made by us with reference to these blocks may well mean inspection by the Building Commission to correct faulty fire escapes, by the Boston Fire Department to require the removal of rubbish, by the Fire Prevention Commission to order the installation of sprinklers, by the Board of Fire Underwriters to make the powerful appeal, possibly also by the Board of Labor and Industries, which may in the interest of other kinds of safety help us to secure wider aisles between machines.

The Consumers' League feels that there should be one central authority responsible for fire conditions in industrial establishments in our city and in our State, with an adequate body of competent inspectors, and with authority to make regulations or to recommend to our general court such comprehensive regulations as shall safeguard the lives of our industrial workers. It might be well to assign this duty to the Board of Labor and Industries, the only body supposed to make regular inspections in the interests of employees in such establishments. If the League is to lead in a constructive campaign to secure such centralization of power it must ask for strong support from its members and from the general public.

## Favorite vs. Favorable Bidder

IT was a long stride toward the encouragement of quality in construction work, when specifications were made to read that bids should be awarded to the lowest responsible bidder.

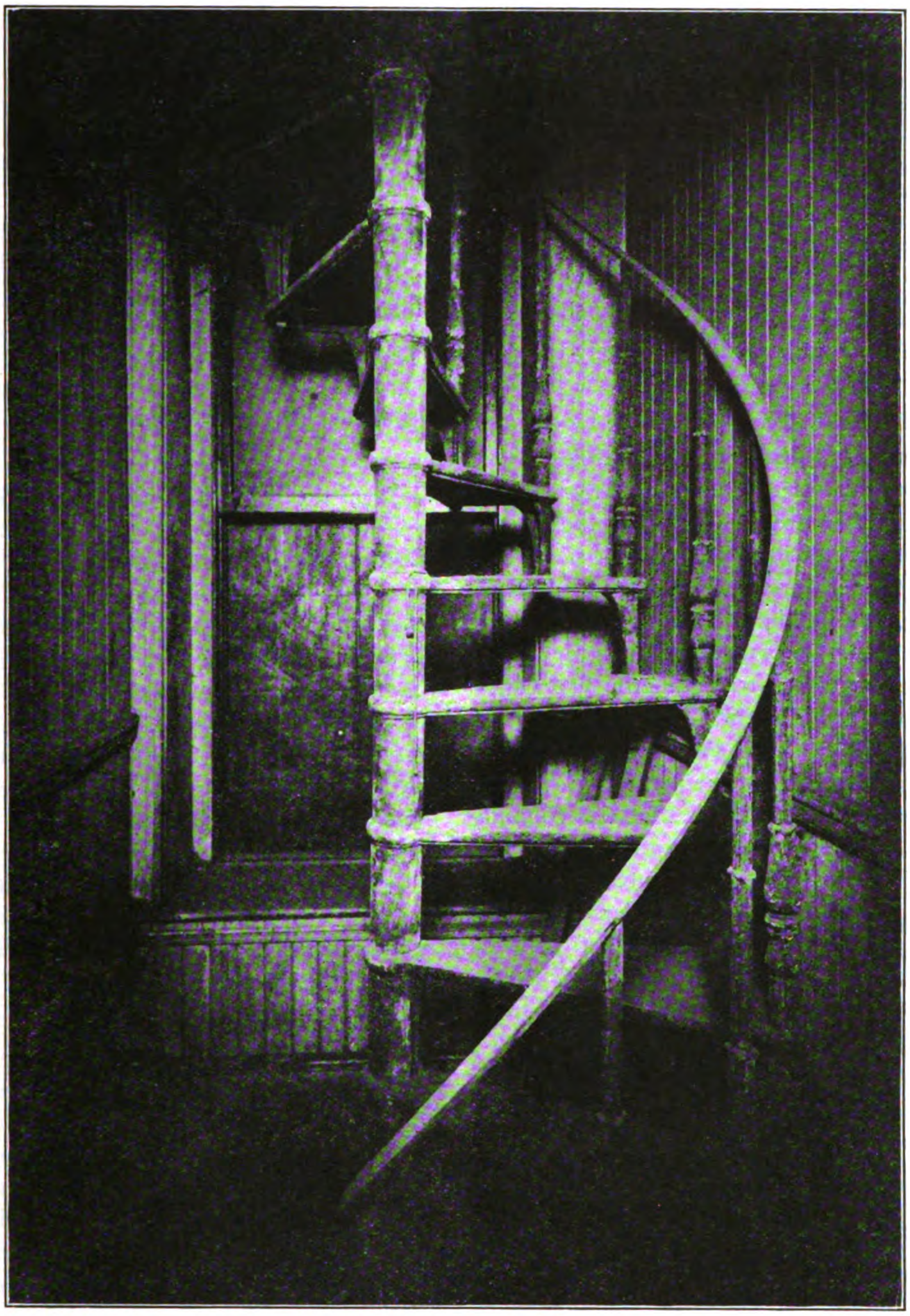
But even this does not go far enough. A satisfactory financial statement does not always predicate a satisfactory business character.

The Board of Gas and Electric Light Commissioners of Massachusetts hits upon a still more promising word. It says:

"Dealings shall be with the bidder whose bid is the most *favorable*, to be ascertained by honestly conducted competitive bidding."

Who says the world is not getting better every day?—*Knickerbocker Komments.*

An interesting thought is crystallized in the little paragraph quoted above. There can be no doubt that the tendency to award contracts to the "most favorable" bids should be encouraged.



Spiral Fire Escape, Showing Wooden Partitions Without Proper Exit

## Industrial Home Building at Elizabeth, N. J.

ELIZABETH, N. J., a city of large industrial interests, is seriously concerned over the problem as to how it can care for its rapidly growing army of workers and their families. A special committee of the Chamber of Commerce, selected to deal with the important question, recently visited Bridgeport, Conn., in search of enlightenment and will go to other centers that have met and solved problems now before the Harbor City and its governing officials.

Owners of important industrial plants are appreciating as they never did before the vital importance, both from a moral and physical standpoint, of properly housing their employees, and the community that fails to co-operate with the manufacturers in such an effort will shortly find its industries moving to more wideawake centers.

# Fire Tests of Building Materials in New York City

By Rudolph P. Miller

*Chairman, Board of Standards and Appeals, New York City*

WHEN we speak of making our buildings more fireproof we should not deceive ourselves into believing that we are making them absolutely proof against destruction by fire. Any material may be destroyed by fire, provided the fire be of sufficient severity. Different materials, of course, are differently affected by fire. When we speak of a fireproof building, we mean one that is so constructed that its several parts will resist the severest fire that is likely to occur in the building, at least to the extent that the building itself will not be irreparably destroyed.

### *Incombustible, But Not Firesafe*

We think of iron and steel as materials that should withstand fire; that they are incombustible there is no doubt; but without protection they will not stand any prolonged high temperature. The unprotected cast iron columns in every building in which a severe fire has occurred have been known to fail in every case. This fact was strikingly illustrated in the fire which destroyed the Parker building, in New York city. It was supposed that the cast iron columns in this building were properly protected, but the protection was not sufficiently secured, with the result that the columns themselves failed. What happens to an unprotected or a badly protected steel column is illustrated by numerous examples from the Baltimore and San Francisco fires. Floors of fireproof buildings, too, must be properly designed, or they will not sustain their loads during a fire, as was strikingly illustrated by the Equitable Building in the Baltimore fire.

### *Unprotected Steel Easily Destroyed*

An excellent illustration of the difference between non-fireproof (though incombustible) and fireproof construction, is presented in a fire that occurred at an industrial plant in Bayonne some years ago. A shed of unprotected steel construction was so destroyed that nothing but a mass of junk was left when the fire was over, while the same fire, having entered an adjoining reinforced concrete building of the same plant, burned off the non-fireproof roof, the only further damage to the building being a hole punched in the floor of the top story by the dropping of a large tank on the roof when the roof had been weakened by the fire.

### *Testing Building Materials*

Much work has been done in recent years in the study of materials and forms of construction, with a view to making buildings more fire-resistive. Scores of tests have been made under the supervision of the building authorities of New York, the principal of these being made to determine the fireproofness of different floor constructions. For this purpose a test structure of brick or concrete walls is erected. For the roof of this structure the floor construction to be tested is used. On a grate built about 2½ feet above the ground level, a fire is built and maintained at a temperature of about 1,700 degrees F. for four hours. Water from ordinary fire hose is then applied to the floor, the floor in the meantime having been loaded with 150 pounds per square foot. After the fire is quenched and the floor has cooled off, the load is increased to 600 pounds per square foot. If the floor meets this test successfully it is accepted as a suitable floor to be used in fireproof construction.

### *Practical Testing*

When the Butterick Building was erected, the owners, desirous of making sure that their building was really fireproof, had a test made in the building itself, on a part of the construction selected at random by Professor Woolson, of Columbia University, who was engaged to make the test. A test structure, similar to the one described, was erected in one of the upper stories of the building, immediately under the floor and one of the important girders of the building, and the test of the character already described was conducted. The result demonstrated the judgment of the designers.

Tests similar in character to these just described, though not so extensive, have also been made in large number on different forms of partition construction. In this case the fire is continued for only an hour and the water application is not quite so severe.

### *Column Protection Uncertain*

Little work has been done on the testing of the most important element in the building from the standpoint of fire protection—namely, the column. The Bureau of Buildings some years ago conducted some tests on small samples, with a view to determining, if possible, the efficiency of certain materials already in use. It is felt, however, that these tests are not sufficiently conclusive, and there is now in preparation a series of tests on full-size columns, fully loaded, with different forms of protection, the results of which should prove of great value.

That investigations of this character have had effective results, are shown by several fires in rooms of some of our fireproof buildings that have been confined entirely to the rooms in which they originated. In several instances there was no knowledge of the existence of such fire until the fire had burned itself out. A notable case of this kind was the fire in the Singer Tower, which destroyed the entire contents of an office without appreciable damage to any part of the structure, and practically unknown to those who were in the building at the time.

# Shall I Build Now?

By C. Stanley Taylor

*This article, of timely interest to the building and property-owning public, appeared in a recent issue of REALTY, the national magazine of the real estate interests of America.*

RAPIDLY growing throughout every industry and building activity in the United States is the realization that a careful analysis of producing conditions and cost constitutes one of the most important factors in the commercial activities of the country.

In many cases progressive individual manufacturers have instituted special departments of their organizations for the purpose of studying producing and marketing conditions; and have installed elaborate systems of accounting. In other instances this work is carried on in a co-operative manner by trade associations.

So, too, those interested in the fields of land development and building construction are learning to look far before they leap. In the field of realty, which, in a broad sense, is constituted of two primal units—land and buildings—careful attention is being given by leaders to the question of *logical* land development and to the important subject of common-sense building construction, having in view the factors of first cost, maintenance, appreciation and depreciation of values, and marketability.

In view of these developments, and particularly when the existing conditions of labor and material costs are taken into consideration, it seems logical that the course of wisdom for the individual prospective builder of any type of building is to apply such logical reasoning to his particular project; and it is for the purpose of directing his attention to conditions having an important bearing on his decision that this article is presented.

### General Classification

For the purposes of this article it will be well to divide the field of prospective building construction into several broad classes and to consider separately the advisability of building in each class during the present year. The classes to be considered are: investment building, which includes office buildings, apartment houses and retail store properties; industrial buildings such as factories and warehouses; buildings for public use such as schools, churches and libraries; buildings for public accommodation such as hotels and theatres; and finally, of exceeding importance, home building.

### General Outlook

While it is true that in 1916 the monetary figures of building construction ran far above the average of the ten years before, this does not necessarily imply that we have entered upon an era of profitable construction. It must be realized immediately that the high figures of last year were due not to a solid increasing demand but to abnormal market and world conditions.

The tremendous increase in our European markets immediately brought about a pressing demand for increased manufacturing facilities and for additional labor. Hundreds of large plants were erected, in which the time element was all-important and building time records were broken without a thought as to the expense. Labor being so much in demand has resulted in leaving many of the building material manufacturing plants short-handed, wages have been raised, transportation costs have increased to an extent which has made the shipping of many kinds of building material almost impossible and in many cases impracticable. The overhead costs in every plant have increased with leaps and bounds and the high prices obtainable in cases of forced demand, together with the increase in manufacturing costs, have resulted in bringing up the average prices of building construction fully 60 per cent of that of five years ago.

This, then, is the first general condition that the prospective builder faces to-day; that a building costing $10,000 to construct five years ago will cost to-day in the neighborhood of $16,000, and may cost only $10,000 five years hence. Therefore he must make the possibility of *valuation depreciation* one of his important subjects for consideration.

### Investment Building

Speaking generally, and being fully aware of the danger of establishing a paradox in the editorial policy of *Realty*, our readers are strongly advised against building any type of investment building during the next two years, excepting, however, under the conditions which will be outlined hereafter.

Let us consider for a moment the question of apartment house construction, which at this time is interesting many in the real estate field. This type of structure offers the best possibilities of any in the investment field to-day *where the factor of valuation depreciation will be logically offset by other conditions.*

The rapid development of urban transit facilities in many of the large cities of our country constitutes one condition which will logically offset valuation depreciation. In New York, San Francisco, Denver, Cleveland, Detroit, Chicago and other large cities the work of greatly increasing public transportation facilities is being rapidly carried out. Let us consider, then, as a case in point, the proposed construction of an apartment house along the line of one of the new subway extensions in New York City, or along the lines of new transit extensions in San Francisco or Cleveland.

If the land for the proposed building has been or can be purchased at a reasonable price in which the valuation has not already been greatly increased by the improvements of transportation facilities, it is logical that the land will increase rapidly in value as the section is developed and that this increase in valuation will help to offset the building valuation depreciation. Rental values in the neighborhood will naturally be greatly increased because of the demand resulting from improved conditions of public transportation.

Summing up, we have this result: rental value plus increased land value may offset the possibility of the depreciation in building valuation. If, five years hence, the same apartment building were to be duplicated in that neighborhood the cost of building might be and undoubtedly will be considerably less, but, on the other hand, the increased cost of land will bring up the total unit cost about equal, while rentals will not be higher, if as high. Hence, along lines of improved transit facilities, apartment houses investment building may be safely undertaken after careful figuring as to returns.

In a section not so affected, however, this type of investment is warned against, even though at the present time rental possibilities may seem encouraging. Rents, in many cases, are up with the "high cost of living" and are paid because many persons are enjoying increased earnings; but when the labor demand lessens, and it is already lessening, so will rental incomes grow less, the cost of building less, and there will be no recompense for such investment made at the prevailing high cost of building.

The matter of office building and retail store construction should be given the most careful consideration. Under present conditions many new business ventures are being launched which will fall flatly in the next five years. There is a strong demand for office accommodations as a result of this condition, but in most localities the provision of such rental space has been sadly overdone and the business population of the locality moves constantly from the older to the newer buildings, leaving behind them during the slow years the shells of what had been considered splendid building investments. The successful office building owner is that wise individual who knows the secret of picking the sheep from the goats of investment building, who does not allow himself to be swayed by abnormal demand but rather studies the conditions which bring about a sensible and lasting demand for office space and buildings modestly to supply that demand.

Retail stores, of course, follow the line of increasing population and perhaps the best-paying investment to-day is that of the construction of so-called "taxpayers"—inexpensive one or two story store buildings along the new and improved lines of transit. This type of construction, even at the prevailing high prices of materials and labor, is comparatively inexpensive and the increase in land value soon offset the building valuation depreciation.

### Industrial Buildings

The demand for industrial buildings is already falling off rapidly owing to changing conditions in the foreign markets. The buying of materials and labor for such projects is now being carried along on closer and more careful lines, and as labor is released into the building material field, particularly with the renewal of immigration after the war, the costs of materials and labor, and consequently the cost of this type of construction, will be materially lessened. It is therefore advisable in those industries which expect a normal steady period of good business in the more legitimate lines of manufacture to go somewhat slowly in the matter of constructing new buildings.

### Residential Building

The year 1916, which showed such a remarkable increase in general building and contracting figures, was not a particularly striking year from the standpoint of residential construction; in fact, all reports show a falling off in this type of construction except in certain localities where housing demands were excessive and, as a rule, the type of construction employed, particularly for industrial housing, was of a poor and makeshift type.

During the next year, however, we can look forward to considerable increase in homebuilding, due to the fact that there is no more money available for that purpose; that a consistent housing propaganda is being carried out by many manufacturers and in many communities and to the fact that there is a strong "back-to-the land" movement, which is resulting in increased demand for housing facilities in the suburbs and farm sections.

In the matter of whether or not it is advisable to build a residence at this time, there are certain factors to be considered. If the building is to be occupied by the owner as a home and is not in any manner considered an investment or speculative project there is no reason why it should not be built now except that of high cost. If the prospective builder is willing to invest in a home at the present prices of building materials and labor, and if he feels financially able to do so, there remains no question of advisability.

Even as in apartment house construction, the land upon which it is proposed to build may be in the path of logical growth of the city or town and may be increasing in value in a manner sufficient to offset depreciation of material values. It must, of course, be realized that the $5,000 home of five years ago will cost approximately $8,000 now, except in cases where the home is located so close to the source of building materials that some reduction in cost may be enjoyed.

Just when residential construction will be cheaper is problematical, but a very few months should see some reduction in prices and another year should bring the cost down at least 10 per cent., speaking without reference to land value.

From the investment standpoint in the question of residential construction, it must be realized that after the period of forced coincident and natural prosperity which we are enjoying will undoubtedly come a lull, and possibly a period of severe depression. This depends largely on what disposition is made of the floods of gold which have been entering this country during the last two years. If this money is given out in the form of large loans to other countries, thus fostering and encouraging strong trade relations after the war, the nation's business will be placed on a solid basis and one conducive to the building, buying and occupancy of homes by Americans.

# How to Organize a Fire Drill in Your Factory

By Chief Guerin

*From "Protecting Your Factory Against Fire"*

FIRE and panic go hand in hand, and close behind lurks death—unless your workers know what to do if emergency arises. But *you* have to teach them.

The object of a fire drill is, first, to train employees how to use fire apparatus provided by the company and second, to prevent panic by teaching the employees to keep their heads and use exits in an orderly way. More lives are lost in panics at fires than in any other way.

It makes no difference if you employ a dozen workers, or a thousand; whether your factory is a one-story frame shed or a massive structure of steel and concrete, in the frenzied rush for the doors one or more may be hurt, if not killed. And the courts lately are holding employers liable for such injuries or deaths.

The easiest way to organize a fire drill in large cities is to invite the assistance of the Fire Chief. Put your problem up to him. Tell him what you want. He will assign an officer to undertake the work, and it will be done *right.* This officer will come into your plant and instruct your men in the way to take care of themselves.

### Inexpensive Protection

The sole expense to which you will be put is to put in a signal bell—preferably a gong—on each floor with an annunciator in the office which will show the location of the station from which the alarm is sent and signal stations from which to transmit the alarm.

It may be that the factory is in a small town or village, or that the services of a local fire department expert cannot be had. It is for such cases that the following directions are given.

The first step in organizing a fire drill is to number each exit on each floor. Stairs, fire escapes, bridges to other buildings, or doors leading to the surface, should be indicated by red lights and by a sign "Exit" in red. The numbers should be plainly indicated in red. Passageways to all exits *always* should be kept clear.

*Floor Captain*—Appoint one man—preferably the foreman of each floor—to be floor captain. It is the floor captain's duty to give the signal to the employees to leave their work and to direct which exit to use, should one or another be cut off by fire or smoke. Each floor captain should have an assistant to act for him in case of his absence. The floor captain's orders are final on his floor.

*Squads*—Divide the employees into squads of twelve to twenty individuals, depending upon the number on the floor.

*Monitors*—Each squad should have a leader, or monitor, whose duty is to see they leave the building safely and march out of the way of the firemen.

*Stair Guards* should be appointed to maintain order on the stairway and to give any assistance necessary while the employees are marching out. Not until all are out should they leave their position.

There should be as many stair guards on each floor as there are landings on the various stairways and fire escapes between the floor in question and the one below.

*Searchers*—Besides the floor captain, monitors, and stair guards two or more employees (of both sexes if necessary) should be appointed as searchers, to go through wash rooms, lavatories, cloak rooms, etc., to see no one is left behind. It is their duty, also, to help any who may have fainted or who may be otherwise unable to save themselves. The searchers should be the last to leave. When they go they must see that all doors to all exits are closed. If the fire is an adjoining building they should also see that all windows are shut.

*Exits*—After the employees are divided into squads, a particular exit should be assigned for each to use in case of an emergency. The exits assigned should be the ones most convenient to that part of the floor where the members of the squad are employed. In case of fire one or more exits may be cut off by flames or smoke. Hence there should be a second and third choice of exits for each squad. To accustom the workers to all exits it is well during drills to close one exit or another—a different one each time.

The floor captain should choose which exit to close. When the alarm sounds it should be for him to announce which exit is not to be used.

In short, effort should be made to reproduce conditions of a fire as nearly as possible, and to have each employee know what to do under any circumstances.

*Alarms* for fire drills should be under the direction of the Fire Chief of the plant or his assistant. They are the only ones who should order an alarm to be sounded, and none, aside from them, should know that the alarm is for a drill and not for a real fire.

When the fire alarm is sounded every employee should rise and place his chair or stool on a table or a machine. The power should be shut off all machines, by the engineer if necessary.

The floor captain then gives the order, "Exhibit No. 2 (for instance) not in use. Squads A, B and C, use exit No. 5."

The monitors then lead the employees out. The Stair Guards should precede the first squad to the doors and take their places on the landings. If exit No. 2 is temporarily closed, for instance, all No. 2 Stair Guards should depart with the squad to which they are nominally attached.

It is far safer, while marching out, if employees link arms. In this way the actual physical touch will tend to calm excitable ones.

When the alarm sounds, the Searchers start at once on their tour through the cloak rooms, etc. Time should not be allowed for employees to get cloaks, hats or other property. Such delays cause many lost lives in factory fires.

While the squads are leaving, members of the city Fire Department or the company's Fire Brigade may be at work laying hose or otherwise preparing to fight the fire. Employees should take care not to interfere with this work just the same as the firemen must put nothing in the way of their leaving.

Always include the office force in the fire drill. Even the officers of the company should not ignore the alarm.

All books and valuable papers should be put in the safe and vault, which should be closed and made ready for locking. Where there are time locks on the safe, it is better, however, to await a second order before the bolts are shot and doors made fast.

*Fire Alarm Box Runners*—One or more employees should go at once to the nearest city fire box and turn in an alarm, while another should telephone the alarm to headquarters. By putting this duty on two men a little rivalry will be caused which will lead to far greater speed in calling the fire department.

# Statement of the Origin, Plan and Purposes of the National Fire Resistance Council

***With this issue CONSTRVCTION becomes the official organ of this great co-operative effort which has been organized for the purpose of bettering building conditions in the United States; broadening the market for fire resistive, fire retardant and protective materials and devices; and creating a greater demand for structural service of the better types.—Editor.***

THE fire loss of our country is inextricably related to the ability of our erected buildings to resist fire, due to the materials of which they are built, how these materials are assembled and how the buildings are protected.

The fire loss problem should be divided into three divisions given below in order of their importance, as follows:

1. *Construction and Equipment.*
2. *Fire Prevention.*
3. *Fire Extinguishment by Fire-Fighting Forces.*

Exactly the reverse is the order in which the problem has been and is being attacked. In other words, most attention has been given to the perfection of fire-fighting forces, lesser and more recent attention to fire prevention, and comparatively little attention to construction and equipment of buildings. We are considering the question of its national aspect.

### To the Reader

How would you answer any or all of the following questions, to-wit:

1. How would the reduction of the preventable fire losses affect you?

2. Do you believe that the solution of the problem lies in the nation-wide insistence on better buildings and better conditions?

3. If so, what steps are you taking to accomplish this for the benefit of the public and of yourself?

Consider the following facts and then read what follows in this article describing the origin, plan and purpose of an organization which has been formed for the definite purposes indicated in the above-named questions.

### Do You Realize?

1. Combustible materials comprise 85 per cent of the total of structural materials used in buildings, leaving only 15 per cent of materials used which are of fire-resistive quality, measured in values.

3. One per cent only of all buildings in our country are as "fireproof" as our best building practice permits; the remaining 99 per cent being more or less readily combustible.

3. Even a considerable portion of the "fireproof" buildings contain highly combustible materials?

### THE PROBLEM

Everyone knows that our national fire loss is of immense proportions in its cost in lives and dollars and that in large measure it is an *unnecessary* and *preventable* waste.

That it is waste at all makes it an economic problem for every inhabitant of our country to consider. Each person pays his share—either directly or indirectly—and therefore is interested in bringing about its reduction.

But what is everybody's business is nobody's business and, moreover, the prevention of fires in a highly technical subject for which not many are qualified—and so the paradox exists that we have been, as a people, paying far more attention to the putting out of fires than to their prevention.

### Fire Fighting

Our ability as a people to put out fires is high—higher perhaps than any other nation. We are justly proud of our fire-fighting forces, the splendid personnel and the efficient apparatus.

So if the question was one only of *putting fires out* we have the men and we have the material to do this well.

Yet our loss remains excessive!

### Fire Prevention

Our people then attacked the problem of fire prevention. In recent years more and more attention has been given to this subject, as distinguished from putting out fires.

While the loss remains high and shows little diminution, it must be remembered that with the growing complexity of our civilization, the hazards and causes of fires are greatly increasing all the time. It would be hard to say what increased hazards we have had since the advent of the automobile and the large use of gasoline and since the increased use of electric devices in households. These illustrations will serve to explain our meaning.

In the work of fire prevention the fire insurance companies and their important agencies, notably the National Board of Fire Underwriters, together with other agencies of a national usefulness, such as the National Fire Protection Association, have devoted great effort—in a large measure unselfish—to the question, with pronounced results for good.

Many cities—for example, Chicago and New York—have established fire prevention bureaus, which, by teaching the people to avoid the accumulation of combustible refuse and by frequent inspections of buildings for the purpose of finding structural and operating defects and requiring that these be remedied, are doing excellent work.

Fire-Prevention Day has become an institution in our land. Many cities and States set apart a day in each year devoted to cleaning up, disposing of combustible rubbish and teaching children and "grown ups" how to be careful with fire. In this manner the public is being aroused to the importance, and educated in the practices, of fire prevention.

All of these efforts are doing immeasurable good in fire prevention, and were it not for them we would have been appalled by more than one city-wide conflagration and by more than one horrible holocaust, which, fortunately, have not happened.

So we have seen that we, as a people, are studying and acting fire prevention and that we, as a people, possess the most efficient fire-fighting forces in the world and—still the problem is not solved.

## THE ANSWER

### Construction and Equipment

The answer is found in the way we build and equip our buildings; in the materials we use in their construction and in the manner we assemble these materials together; how we equip these buildings; how we protect them by automatic protection, and how we use them. In a word "Construction," which word happens, appropriately enough, to be the name of this magazine, the official organ of the National Fire Resistance Council.

### Fire Safety in Construction

Constructors have reached after an ideal and have developed so-called "fireproof" buildings. When we count up all of the buildings erected we find that only about 1 per cent of such buildings are so-called "fireproof" and that 99 per cent of all buildings erected are more or less readily burnable—generally and unfortunately—very readily burnable.

There must be—there is, without question—a direct relationship between the above fact and the excessive fire loss of our country.

It goes without saying that if the 99 per cent of all buildings were made unburnable instead of readily burnable, then the loss by fire would be practically extinguished.

## THE PURPOSE OF THE N. F. R. C.

The purpose of the National Fire Resistance Council is, therefore, to work for an increase of fire-resistive buildings and an increase in the use of protective devices.

### The Purpose is One of Public Welfare

This purpose is inescapably for the public welfare, for the saving of lives and property and for the amelioration of the economic problem of fire loss.

It has been said that no altruistic movement is carried forward so well or so efficiently as when there is a selfish motive coupled with it.

Who knows more about the materials of construction of fire-resistive value and of the protective devices than the manufacturers of the materials themselves? Starting and supporting this movement logically therefore becomes the privilege, responsibility and duty of the producers themselves, banded together in a large number from all of the industries. Such support gives a moral force to the movement which, used with clean hands and clean purposes, will give to the country immeasurable benefits.

### Origin of the Movement

About two years ago certain men, imbued with these ideas, in different basic industries furnishing fire-resistive materials of construction, began holding meetings—conferences they were called—to see if it was possible for the many industries to agree upon the basic principles of the problem and upon a broad, useful, national, constructive program.

Several of such conferences were held in different cities, which resulted, first, in agreement on the basic principles involved, and second, upon a constructive program based on these principles.

The fundamental thought, however, was that the work must be conducted for the public good as a paramount consideration, and that then if this work resulted, as it unquestionably would, in a larger use of fire-resistive building materials and protective equipment or devices, although a secondary consideration, it would give a legitimate reward for the work undertaken for the public good.

The last conference, in October, 1916, showed that the industries conferring had reached an agreement, on basic principles and constructive program of national scope, with practical unanimity.

At this point it became evident that the movement (up to that time without a name) should have a name and existence, and that it should be placed in shape and position to pursue the work on the broadest possible scale of usefulness. It was given the name National Fire Resistance Council, and a committee was created, charged with the duty of working out a plant of organization.

This committee worked and reported on January 19 last, recommending a plan of organization, which has been put into effect.

Such is the story of the birth of the National Fire Resistance Council.

### Plan of N. F. R. C.

For many years some persons, now charged with the work of carrying forward the work of the National Fire Resistance Council, had been advocating and working for the principle of classifying materials of construction in accordance with their fire-resistive value and that their respective values should be determined by appropriate fire tests.

These persons had a precedent to guide them.

The International Fire Prevention Congress met in London, England, in the year 1903, at the invitation of the British Fire Prevention Committee, to consider the question of fire prevention.

This Congress adopted four basic principles, as follows:

1. The word "fireproof" was a misnomer, as nothing was strictly "fireproof," and recommended its use abandoned.

2. The term "fire resistive" or "fire resisting" should be substituted for the word "fireproof."

3. There were degrees in fire resistance which should be recognized in three broad classifications, to which they gave the name "Full Protection," "Partial Protection" and "Temporary Protection" respectively.

4. That tables of fire tests should be established for materials and parts of construction belonging in "Full," "Partial" and "Temporary" groups, respectively.

It will be noticed that this plan widened out the classification of fire-resistive materials so that such materials of varying degrees of fire-resistive value could be used in the construction of 80 per cent or over of all buildings erected. This plan is in vivid contrast to the arbitrary confinement of "fireproof" materials to only 1 per cent of all buildings erected. It meant, if it meant anything at all, a raising of the standard of the 80 per cent or over of buildings, in marked degree, if their fire-resistive value through the using in their construction of more fire-resistive materials.

In 1914 the National Fire Protection Association adopted the same principles. More recently the competent committee in the American Society for Testing Materials has approved the same principles.

The National Fire Resistance Council, as a first step, has adopted this plan—originated by the British Fire Prevention Committee, and adopted by the International Fire Prevention Congress, by the National Fire Protection Association and by the competent committee of the American Society for Testing Materials—as the first item in its constructive program, because the plan is so soundly logical and so generally beneficial.

Undoubtedly an improvement in the terminology used might be, and probably will be, made, as there is psychological objection to the terms Full, Partial and Temporary, but the principle is sound.

The National Fire Protection Association went a step farther, and in 1916 adopted the principle of grading completed buildings into three grades, A, B and C, in every "class" of building to denote their relative fire-resistive values.

The National Fire Resistance Council has adopted, as a part of its constructive program, the grading of completed buildings, but has gone one step beyond the National Fire Protection Association, in recognizing that grading depends not only on the construction, but also on the protective devices employed.

We have seen, therefore, that the National Fire Resistance Council has followed the precedents laid down originally by the International Fire Prevention Congress in London in 1903, and as extended by the important national bodies in our own country, in that it subscribes to the following comprehensive plan of classification, embracing materials and completed buildings.

1. The adoption of the term "fire resistive" or "fire resistant," in place of "fireproof."

2. The grouping of materials of construction into three (or more) groups with appropriate fire test specifications to determine in which group different materials or parts of construction belong.

3. The grading of completed buildings in accordance with their fire-resistive value, depending on either their construction or protection, or both.

4. The use of the word "class" (or its plural equivalent) to denote what a building is designed or used for.

5. Embodying this whole scheme of classification of materials and completed buildings into a standard building code.

## The Logic of All Inclusive Co-operation

The National Fire Resistance Council has been started by, and its support comes from, the many industries producing and directly interested in fire-resistive materials and protective devices. The work is, however, primarily for the public benefit, as the object is to effect substantial reductions in the national fire loss.

It is beneficial, moreover, to the fire insurance bodies.

It is good for the fire underwriter because the total of fire insurance premiums only exceeds by a small margin the total of fire losses, plus the expense of conducting the business. This margin is hardly sufficient to pay 2 per cent per annum on the invested capital in the fire insurance business. And so the fire underwriters would be financially benefited by a reduction of the fire loss, as they could then afford to substantially decrease premiums and make more money.

Broad-minded and far-seeing persons among the fire underwriters recognize this and are advocating and working for improved and protected construction —not alone because this will result to their financial benefit, but because, in the main, they wish for a saving of loss to the country at large.

So it is logical that the National Fire Resistance Council will work in complete harmony with the fire underwriters of the country, and this desire, we are confident, will be met and responded to cordially by them. Indeed such is at present the case.

It is good for the National Government, which represents the interests of the people at large. The loss by fire, counting direct and indirect, approaches closely, if it does not reach, the stupendous total of one thousand million dollars, as well as upwards of 1,600 lives, per annum.

This amount averages $10 for every man, woman and child in this country every year, or to put it in another way $30 per year for every wage-earner in the land. This has to be paid for by these wage-earners, who thus become directly interested in its reduction and can properly demand of our Government that it shall encourage and assist in its reduction.

We have seen, then, that the producers, the fire underwriters, and the United States Government, as representing the people at large, are, each and all, vitally interested in the reduction of the national fire loss.

What is more natural and logical than that all of these forces shall co-operate and work together?

The National Fire Resistance Council, in the rooted conviction that such widespread co-operation should exist, is working to this end and has already found opportunities and welcome in effective co-operation with the forces named, and has already been a party to securing substantial progress in some important steps towards its objective.

The National Fire Resistance Council believes in the good intentions of humans in the mass and has found a ready and responsive willingness to work with it, from men and institutions in apparently divergent interests and activities, as soon as it was made clear that the work of the Council is for the public welfare.

What it is possible to accomplish in these ways for the betterment of national conditions only time can tell, but sufficient has already been accomplished to justify optimism. It will probably greatly exceed our present optimistic expectations.

### Object Not Profit Making

The National Fire Resistance Council is not a profit-making institution, but is consecrated to the public welfare.

It employs a corps of trained and specially fitted men for its work who are comfortably, not over, paid and requires and uses the necessary facilities for carrying on its work.

Its members are in the peculiar position of being both selfish and altruistic—selfish because they are benefited and altruistic because they are supporting a work by which the public is, and will be, benefited.

### Membership

The logical membership, drawn from manufacturers and users of fire-resistive and protective materials, devices and apparatus and all other activities making for improved building construction methods, is large in numbers and influence and collectively and *in this way only* can exert the greatest influence possible in the reduction of preventable fire loss.

*Your* co-operation is wanted. You can co-operate by giving the work your sympathy and good word and by taking membership in the National Fire Resistance Council and urging others to do the same.

NOTE: Your attention is especially directed to the advertisement on the back cover of this issue.

***An Important Announcement!***

***Full Information as to Organization and Officials of***

**N. F. R. C.**

**NATIONAL FIRE RESISTANCE COUNCIL**

***Will Be Given Upon Application to the National Headquarters***

**18 East 41st Street**
**New York City**

# LEGAL DEPARTMENT

*Edited by* **WILLIAM LAW BOWMAN, C.E., LL.B.**

## A Uniform Mechanics' Lien Law

THE efficiency engineer has worked marvels in the manufacturing and business world, so that to-day he is a recognized necessity. His field has carried him into situations where there were serious doubts as to his ability to accomplish any saving of time or of wasted energy. Why have not his general principles been applied in other lines where the same wonderful results are sure and certain and where the advantages will even benefit more than his present field of endeavor? I refer to the mass and confusion of statute laws existing in the various States of the Union, or even in any one State. The layman knows in a general way of this condition, but the legislator, the lawyer, the manufacturer, the producer and the officers of corporations who have to wrestle with such existing conditions have a continuous nightmare. Why should one who desires to know the conditions governing and controlling public contracts in New York State have to examine and study the County Law, the General Municipal Law, the General City Law, the Public Buildings Law, the Second-Class City Law, the State Boards and Commissions Law, the State Finance Law, the Town Law, the Village Law, the Canal Law, the Canal Improvements Law, the Canal Terminals Law, the Education Law, the Highway Laws, the Insanity Laws, the Military Law, the Poor Law, the Prison Law, the Public Health Law, the Rapid Transit Law, the State Charities Law, the State Printing Law, the Labor Law, the Lien Law, the Penal Law, etc., etc.? Under these circumstances it would seem that the mere calling attention to such a state of affairs would cause the passage of a uniform law governing the purchase of supplies and the contracting of construction work to be paid for by public money. On the contrary, although such a uniform law has had the study for several years and been one of the endeavors of a society trying to help contractors and material men, yet little has been accomplished in the way of actually passing such a law. Having used this merely as an example of certain existing conditions and of the need for uniformity, attention is now directed to the even worse and more chaotic condition of the so-called mechanics' lien laws throughout the country.

Fundamentally the basis of business is credit. Hence anything that automatically guarantees payment gives credit to many who otherwise could not secure it and thus increases sales. Although little considered from this point of view, yet it is with this idea that producers and manufacturers of building materials, contractors and all benefited by mechanics' lien laws should study such laws. In formulating a uniform lien law that one idea should be kept predominant as a necessary offset to the limited legal liability of corporations by whom most construction work is carried on.

Under the old common law a lien was given to workmen and artisans who added value to chattels under contract with the owner. As early as 1791 the State of Maryland passed the first real mechanics' lien statute, its object being to encourage master builders to undertake the building of houses in the projected City of Washington. Under that statute, however, the lien was given only to those to whom the owner of the property was indebted. In this way it was not a very great step away from the old common law principle respecting artisans' liens.

Pennsylvania passed the next statute on the subject in 1803, which at first only gave a lien to those to whom the owner of the property was indebted, but in 1806 an act was passed respecting the City of Philadelphia, which gave a lien to claimants to whom the owner was not himself indebted. Some of the early cases show the antagonism of the judges to these statutes. In one opinion the following is found:

"The second lien (a mechanics' lien) arbitrarily granted to the contractor or material man between whom and the owner there is no privity whatever, so far as I am aware, has no analogy in the common law and stands in many respects directly in conflict with fundamental principles of justice."

Later the opinion states, "but there is no principle of law and no general policy or theory recognized by law apart from the mechanics' lien statutes which specially favors the collection of debts due to the contractors and merchants merely because such debts have been created in the erection of buildings whose owners are not liable for such debts."

Fortunately, we have gotten past these early objections, and, as might be expected, the scope of these statutes is continually broadening. In fact, this matter has been thought so important in Texas that it has been made a part of the State Constitution, Section 37 of Article 16 reading as follows:

"Mechanics, artisans and material men of every class shall have a lien upon the building and articles made or repaired by them for the value of the labor done thereon or material furnished therefor; and the Legislature shall provide by law for the speedy and efficient enforcement of said lien."

However, most lien laws are in the form of statutes and amended by the various State Legislatures at will. With the great number of our States and with different ideas of the ever-changing Legislatures it would be expected to find some differences of opinions, but hardly the variances which actually exist. In taking up the details which follow, it is hoped that the reader will keep in mind the chief purpose of this article; namely, that a uniform lien law should be prepared by material men, contractors and laborers, which should then be passed by the various State Legislatures. It took years and indomitable courage to frame the uniform "Sales of Goods" or "Sales of Personal Property Law," but it has been accomplished and actually put into effect in many States, and there is no reason why the same cannot be accomplished respecting a lien law.

Most statutes granting liens of this character can be classified into either of two systems, known as the New York and the Pennsylvania. Under the latter system each of the persons to whom the lien is given has a direct lien, whereas under the former system the lien is only a subrogation right dependent upon amount due from the owner to the contractor. Why should filing the building contract in Pennsylvania relieve the owner of the land from liability for any lien and the same act in California and Louisiana be a condition precedent to having a right to a lien? By some rather late court decisions the protection of the lien law has been entirely cut off in at least Pennsylvania and Illinois. In the former State it has been held that if there is a contract clause in the contractor's contract, no lien shall be filed that is binding upon a material man. In the latter State a statute giving a sub-contractor a lien irrespective of a stipulation against liens in the contract between the owner and the contractor has just been held to be unconstitutional. Again, in New Jersey it would seem that if the contract and specification are filed, the stop notice provisions do not protect the material man to a sub-contractor or one not a creditor of the general contractor. The question of the protection to such a material man came up under the Texas Constitution, previously quoted. The Legislature in trying to carry out the constitutional provision passed a statute which in wording only granted the lien rights to one who contracted with the "owner or his agent, trustee, receiver, contractor or contractors." This, as can be seen, grants no rights to either a material man or to a sub-contractor or to a material man who furnishes part of the materials to a material man to a sub-contractor. However, because of the broad wording of the Constitution, and because no statute can restrict a constitutional grant, the courts of that State held such material men entitled to the relief granted by the lien laws.

### What Property Can Be Liened?

Under the usual form of lien statutes no lien can be had on any public building unless they are specified. This certainly must be attended to, because the serious and big losses to those who can little afford to have such losses are on that class of buildings where contractors have to sign suicidal forms of contracts and accept specifications filled with all sorts of clubs and uncertainties. This is especially true respecting State buildings in such a State as Pennsylvania, where even the general contractor cannot sue the State even for money earned unless the Legislature will grant permission. Ordinarily the lien rights are granted to those who furnish labor or materials in the construction of "buildings" or "structures" or "improvements," etc., and the decisions as to what come within these wordings are very interesting. In at least three States a bridge is not a "building or structure," and not within the protection of the lien law. Yet in another State poles to carry electric lines have been held to be a "structure," and hence protected. In two States lumber used as forms for concrete construction are given a lien, while in another State it is held not within the purview of the law. Probably the most interesting divergence of opinion is found respecting whether or not a lightning rod is an improvement or not. One State says it is, another that it is not, and still a third that is a question for the jury. As is the general rule in the interpretation of statutes, lien laws are construed strictly upon their exact wording. In that way it has been held that there could be no lien for fire-fighting apparatus furnished for a hotel or cement that went into sidewalks. As would be expected, the protection of a lien is being gradually broadened, probably the most advanced step being that taken in Ohio, where it is provided as follows:

"A person who performs labor or furnishes material for constructing, altering or repairing any street, turnpike road, sidewalk, way, drain, ditch, or sewer by virtue of a private contract between him and the

*(Continued on page 130)*

*Edited by*
**SAMUEL GEORGE WEBB**
*Secretary*
*Gypsum Industries Association*

***A Department Devoted to the Use of***
**GYPSUM**
***In Consistent Firesafe Construction***

# Structural Forms and Uses of Gypsum Materials

IN previous articles we have dealt with geological occurrences, the manufacture and physical characteristics of gypsum. We have dealt with the following factors, all of which have their measure of importance:

Heat Resistance,
Heat Conductivity,
Co-efficient of Expansion,
Effect of Water Application,
Sound Conductivity,
Resistance to Impact,
Crushing Strength.

It is appropriate now to consider structural forms and uses of gypsum materials.

It happens that the writer recently gave a ten-minute talk before the New York Chapter of the National Fire Protection Association at the International Building Exposition at the Grand Central Palace in New York on an interesting recent development in precast form of room slab known as Structolite.

We believe it is timely to reproduce this brief description here for the information of readers of CONSTRVCTION, as follows:

The true value of gypsum as a building material is but little appreciated or understood in this country.

This is so not only as regards owners and contractors of buildings, but also as regards architects, which is the more surprising because many of our architects have received their architectural and engineering training in France and Germany, in both of which countries gypsum is used for many purposes and in many different forms, not used in America.

In the first place, many people know so little about gypsum that I have on many occasions been asked to spell the word "gypsum" and to say what it is. Secondly, many persons think of gypsum only as plaster of paris—unfortunately a misnomer, as it should be called calcined gypsum—out of which statues and ornamental figures are made; while still other persons think of gypsum only as a material for plastering walls.

As a matter of fact, gypsum is a stone which when ground and burned (that is, calcined) becomes what is known as plaster of paris, or, more correctly, calcined gypsum. When water is added it causes the calcined gypsum to set—that is, to revert to its original rock form—by taking up the water of crystallization of which it had been deprived. This taking up of water of crystallization, or "setting," occurs when the material is in a plastic state. While it is in its plastic state it can, of course, be molded to any desired forms.

I will here mention some of the many uses of gypsum in construction:

Wall plaster.
Gypsum plaster board, an incombustible lathing base.
Gypsum block, or as they are sometimes called, "plaster blocks," for the construction of partition walls between rooms; between corridors and rooms; for enclosing elevator and stairway shafts and for the fire protection of steel columns and other steel structural members.
Molded forms for roof decks.
Poured forms for structural floor construction, reinforced with steel and for roof slabs, also reinforced with steel.

Although to such a body as this the question of the fire-resistive value of gypsum is interesting and important, I will not touch upon it at this time for the reason that this subject has been discussed so generally and is now so generally recognized.

To-night I want to speak only about one of the uses to which gypsum is being put for the first time in this country—namely, as a precast form of roof deck used in roof construction.

This development is highly interesting and in this country practically new. It is interesting to review briefly the steps in this development.

Gypsum blocks, both reinforced and unreinforced, in small units have been used for some years as roof decks, but such blocks had to be cast at the factory and shipped to the jobs, with the result that some loss occurred in breakage, and also that freight was being paid upon the water of hydration which such blocks contained.

The thought occurred to a user of such tile who was not connected with the gypsum industry, that a saving in weight and breakage in shipment might be effected if the blocks were cast at the building. This gentleman began experimenting, and, being an engineer, suggested different forms, such as T-beam sections, modified H sections, and so forth. He pointed out that such forms could be reinforced in accordance with engineering practice and that the spans could be increased to 6 and even 10-foot lengths.

Mr. C. Payne designed the roof tile for covering the plant of the Walker Manufacturing Company, at Racine, Wis., on which 10-foot spans were used, covering the saw-tooth roof of the factory building. The design was a T-beam section of slab weighing from 13 to 14 pounds per square foot.

A description of the slabs used, together with the theoretical formulæ and allowable working stresses based on tests, will be found in an article in *Engineering Record* of December 16, 1916, by Virgil G. Marani, member Am. So. C. E., consulting engineer for United States Gypsum Company, and a description of the use of these T-beam slabs in the Walker Manufacturing Company's buildings at Racine, Wis., will be found in *Engineering Record* of December 23, 1916, by Wharton Clay, architectural engineer for the same company.

In Mr. Clay's article it is pointed out that the production of these T-beam slabs molded at the job reached 3,120 square feet per day and that the total time for manufacturing and laying in place 32,000 feet of roof was only sixteen working days, making an average of 2,000 square feet per day, including the time taken in breaking in the gang.

It was found desirable to develop a special form of "plaster of paris," or calcined gypsum, which would quickly set and permit the collapsible sides of forms to be taken down at the end of 10 to 15 minutes after the material had been molded. This calcined gypsum possessed a high compressive strength and quick setting properties.

In the design a factor of safety of four is allowed, but the reinforced gypsum is also designed to be of sufficient strength for its full load when wet, so that the operations of molding and placing in position may be continued during any weather conditions. In the experience at the Racine work, tiles which were molded at night were hoisted into place on the roof the next morning, even though they had been exposed to the rain all night.

During the latter part of January of this year loading tests were conducted at Columbia University, in this city, on these tiles of different cross sections and of different spans.

An average of eight tests gave the following results:

| Length of Tile | Width | Span | Load at Failure | Deflection in Inches | Pounds Per Sq. Ft. Evenly Distributed |
|---|---|---|---|---|---|
| 72 ins. | 15.16 ins. | 69 ins. | 827½ lbs. | .119 | 264 lbs. |

An average of two tests gave the following results:

*Ten-Foot H Sections*

| Length of Tile | Width | Span | Load at Failure | Deflection in Inches | Pounds Per Sq. Ft. Evenly Distributed |
|---|---|---|---|---|---|
| 120 ins. | 15 ins. | 117 ins. | 1,075 lbs. | .214 | 241 lbs. |

An average of two tests gave the following results:

| Length of Tile | Width | Span | Load at Failure | Deflection in Inches | Pounds Per Sq. Ft. Evenly Distributed |
|---|---|---|---|---|---|
| 72 ins. | 15 ins. | 69 ins. | 850 lbs. | .116 | 405 lbs. |

It will be seen from these tests that the factor of safety of four, allowing a roof load of 50 pounds per square foot, is exceeded in every case.

Tests were also conducted by mixing the calcined gypsum with ice water and placing the molded slab immediately in a temperature of 18 degrees F. for two days, and then permitting to thaw out for four hours before testing.

It was found in a test of this character that a slab 72 inches in length, 15 inches wide, 69 inches span, broke at 900 pounds total weight, with a deflection of .156, giving a uniformly distributed load of 286 pounds per square foot.

* * *

## Warning to Owners of Combustible Roofs

ADDRESSING the property owners of Texas, and especially those having wooden roofs upon their homes, or who are exposed by this severe hazard, S. W. English, Fire Marshal of the Lone Star State, says, in part:

"A loose firebrand, a high wind and buildings covered with wood shingles are the three principal elements of a conflagration. The combination of these three elements has caused thirteen conflagrations in the United States within the past fifteen years, entailing a property loss of more than sixty million dollars. Three of these conflagrations occurred in the month of March, 1916, the most destructive of which was at Paris, in our own State. The property loss at Paris approximated at least ten million dollars, and in hundreds of cases wiped out the savings of a lifetime.

"Buildings with wood shingle roofs we have. High winds we are subject to periodically and cannot prevent; so it is against the loose firebrand that we must direct our preventive efforts. The season of the year is now here when a general clean-up is the order of the day. A general clean-up is a good thing, since good housekeeping, individually and collectively, is one of the worst enemies to fire waste; yet we must not get careless in the use of the renovating agency, fire, else with our trash and rubbish we may also destroy our home and our business.

When you are about to start an open fire on a windy day, *think of the danger of a conflagration, and beware!*"

A Department Devoted to the Use of

AUTOMATIC SPRINKLERS

Edited

IRA G. HOAGLAND, Secretary PAUL MASON, Special Representative

National Automatic Sprinkler Association

# The Automatic Sprinkler System

THE automatic sprinkler is the greatest single factor of the times in conservation against fire. It is a valve held in a closed position by a series of links or struts cemented together with a solder of low degree, which fuses when heated by the fire, allowing the links or struts to fall away and the valve to open. A number of these devices arranged in a series of pipes designed to convey water constitute a sprinkler system. The sprinkler heads and pipes are arranged according to designs draughted by engineers.

In heated buildings the sprinkler system pipe contain water, and are termed wet systems. In buildings not heated, the pipes contain air, slightly compressed, which holds shut an automatic valve controlling the water supply. When a sprinkler opens, the air escaping through the opening lowers the air pressure, and the automatic valve opens and admits water into the pipes.

The pipes carrying the sprinkler heads in each story of a building radiate in all directions from a vertical supply pipe, the "riser" decreasing in size as they progress toward the outermost sprinklers. The "riser" is connected at a low point, often in a basement, with the pipes from the water supplies. In standard equipments there must be two supplies.

In the "riser" just above the point where the supply mains meet an alarm valve is generally installed. This device operates whenever water moves in the piping, so when a sprinkler is opened by a fire the alarm valve indicates the fact by admitting water to a hydraulic motor turning a gong clapper or operating a plunger to close an electric circuit and ring an electric gong.

Automatic sprinklers are soon opened by heat, located, as they are, close to the ceiling; and so speedy is the opening that the heat from a fire does not "bank" down low enough to make a room uninhabitable before a sprinkler opens and kills the fire.

The automatic sprinkler is rightfully acclaimed the world's greatest fire fighter. Here are the reasons: It is always on duty. Fire Chief Kenlon, of New York, says the automatic sprinkler is "the silent guardian of life and property, which 'slumbers not nor sleeps.'" It opens on the heart of the fire as soon as the heat makes itself felt, and does not have to be called from its quarters, like the fire department. It pours water on the danger spot, and that spot alone, instead of deluging the building. It can work just as effectively in thick smoke, dense darkness and extreme heat as anywhere else, and can keep up its attack on a stubborn fire under conditions which would drive out the human fireman.

And remember that an automatic sprinkler system for the control of fire is a highly specific contrivance, composed of many parts, only one of which is the automatic sprinkler, and that to fabricate an equipment that will give the required service is an art attained only by long experience.

☘

## Approve Automatic Sprinkler Installation

"THE Non-Partisan League, the organization of farmers favoring, among other things, State insurance," says the *Eastern Underwriter,* has circulated a statement by Herman L. Ekern, formerly Insurance Commissioner of Wisconsin, supporting State insurance. He declares the State funds urge the installation of automatic sprinklers to protect life and property, but "as the sprinklers cut down insurance rates to one-third or even one-tenth of what they were before, stock companies cannot be enthusiastic about them. They cut off too much income.

"This statement is untrue. Every inducement is made for the installation of sprinklers, and no one appreciates more than the fire insurance companies the effect that sprinklers have on the burning ratio."

Fire insurance companies, both stock and mutual, have done more than any other agency to popularize the use of automatic sprinklers, a fact that the manufacturers of such equipment fully appreciate. In each of the great rate-making organizations throughout the country, sprinkler experts are employed by the underwriters whose sole duty it is to test sprinkler heads and valves and to counsel property-owners regarding their proper installation. Aside from the primary argument that such protection will very materially reduce the chances of fire loss, with its resultant interruption of business, and perhaps the irreplacable destruction of records, the insurance companies make it to the direct selfish interest of a property-owner to equip his plant with an approved automatic sprinkler service by a reduction in rates wherever this is done. This reduction is so marked that it is hard to appreciate why sprinklers are not found in every building in the land in which human beings congregate or in which valuable property is stored.

Several cases reported in the July, 1916, "Quarterly" of the National Fire Protection Association show that it is a "fatal mistake to do otherwise."

But the most serious fact of all is the following:

That 27 per cent of those responding to the questions (most of them in the smaller cities) do not require sprinkler systems to be put in commission, fused heads replaced and water turned on before all firemen return to quarters.

Only this year there have been several considerable fires in sprinklered properties because fires have rekindled after firemen have returned to quarters without seeing to it that the sprinklers were put back into commission.

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## Power and Persuasion

*Each Equally Efficient in Getting Sprinkler Protection*

POWER and persuasion in securing automatic sprinkler protection were tied for honors in the address of Edward F. Woods, who relinquished the presidency of the Boston Board of Fire Underwriters at the recent annual meeting. He said:

"The efforts of the Fire Hazard Commissioner to reduce danger by fire to life and property has greatly stimulated the introduction of automatic sprinklers and has led to a recognition in rate of equipments not covering the whole of buildings. This is a radical step, but all the information available seems to justify it.

"It is, however, becoming more and more evident that the educative work of the insurance companies is producing more fire protection (automatic sprinklers), the great value of which as compared to fire notification alone is beginning to be appreciated, and I feel that we may congratulate ourselves on the change. Thirty-nine equipments of sprinklers covering entire buildings have been installed during the year, and thirteen equipments covering parts of buildings. The fire record of risks thus protected continues satisfactory; if we could rid ourselves of water losses the loss record would be eminently satisfactory, and I urge the board to guard all means for reducing water loss."

The "Fire Hazard" Commissioner has the power, the insurance companies the persuasion.

## A Uniform Mechanic's Lien Law

(*Continued from page 126*)

owner of the lands abutting thereon, or his authorized agent, shall have a lien for the payment of the same against the lands of such owner."

Some of the lien statutes require that for a lien to attach, the material must be furnished with the intent that it be used upon the building which it is sought to make subject to the lien. For example, where two carloads of brick were purchased before the contract for the building was made, the material man was held not to have a lien. In still another State the burden is put on the material man to ascertain whether his materials furnished were necessary to the work and were used therein. In order to try and protect the diligent material man in this one regard one of the States has passed a penal statute as follows:

"Any owner, contractor or sub-contractor who shall purchase materials on credit and represent at the time of purchase that the same are to be used in a designated building or other improvement and shall thereafter use or cause to be used the said material in the construction of any building or improvement other than that designated without the written consent of the person from whom the material was purchased, with intent to defraud, such person shall be punished by a fine not exceeding five hundred dollars."

### Whose Property Can Be Liened?

Generally speaking there can be no lien on either the land or building unless the owner of the land is one of the original contracting parties or has knowledge of such contract. In at least one State, however, they have broken away from this restriction and held that where one contracts with one not the owner, yet he could have a lien at least on the building. Under the early statutes, if the owner died, that killed the lien. For special reasons certain classes of owners are exempt from lien claims, such as trust estates, and in one State the property of a corporation organized to furnish a home for indigent persons. Some very interesting cases have arisen where consent of the owner had to be shown to acquire a lien. In one case the lot was bought by the husband with his money and title taken in the wife's name without her knowledge. Then the husband entered into a contract for a house to be used by the family. The wife, of course, knew that her husband was going to build, and that the house was completed, and she took a wifely interest in its progress, yet under a statute requiring that where a person sought to charge the property with a lien for supplies which were furnished under a contract entered into with one who was not the owner of the property, it was held that this was not sufficient proof of agency of the husband for the wife.

(*Continued on opposite page*)

and hence there could be no lien. Similarly contractors and material men are ordinarily chargeable with notice of the terms of a recorded lease, and hence if they furnish a lessee with work or materials outside of the terms of the lease there can be no lien. Where a homestead is affected there are sometimes special requirements respecting the building contracts which must be complied with, otherwise there can be no lien. In one State the contract must not only be signed by both the husband and wife, but the acknowledgment of the wife must be taken separately, and in another it was lately held that a contract by the wife without authority from her husband was insufficient to give a lien.

### Lien Right May Not Protect

Of course, even where the lien right is self-evident, there may be circumstances where the lien is of no avail. A mortgage, vendor's lien, or liens of the class of taxes, etc., may have priority. There are also cases holding that if a mortgagee has no notice of work being done or construction being carried on, his mortgage is entitled to priority over a mechanics' lien, even if the consideration for the mortgage is a pre-existing debt, provided also the mortgage is given in good faith. Where the New York system prevails, the lienor is limited to the interest of the person who is erecting the structure or making the improvement. In other words, once the owner has paid the contractor or accepted orders or assignments covering the total amount of the contract price, that relieves the property of any lien. Thus in those cases where the protection is especially needed in the cases where the contractor fails to complete, and the owner, instead of completing under the usual clause in the uniform building contract or as agent for the contractor, declares the contract broken and completes without any reference to the contract, then nothing ever becomes due the contractor, and as a consequence the subcontractor and material men have nothing on which to attach any lien right. Another chief source of loss to those who should be protected by liens is on large contracts where the contractor has to go to a bank or trust company for the financing of his job and as security for loans assigns the moneys due, or to become due, on the contract. In this way the liens are always worth nothing when the contractor fails to complete, usually worth the same when he fails to make a profit, and even worth the same where that particular job may have made thousands of dollars but which were eaten up by losses suffered in previous or other existing contracts. Just because the last seems impossible let us assume certain facts which actually have happened. A corporation takes a large municipal contract and loses $300,000, but because of the financial strength of the officers survives that and takes another contract which finally also shows a loss of $300,000. Yet while the second contract is in operation another contract involving several millions is taken. To recoup the losses and to keep the work all going the corporation has to borrow several hundred thousands and assigns first the final retains, amounting to $350,000, and later assigns other installments due and to become due. The profit on this last work must have been a couple of hundred thousand dollars and there was nothing to which a mechanics' lien could attach because of the assignments.

Under another aspect of the situation the lien right may not protect, and that is due to a failure of the person entitled to the lien to follow exactly and implicitly the statutory requirements as to the form of the lien, the various statements to be contained, the manner of verification, the requirements respecting filing and commencing action thereon within the limited time. The provisions are very strictly applied, and even what seems to the layman the most trivial mistake will lose the right and all hopes of recovery.

It is impossible, in such a short article as this, to do justice to the subject, but it is hoped that sufficient facts have been shown to indicate the unfortunate existing conditions and to lead to a study of the intricacies and vagaries of the countless lien laws in an endeavor to formulate a clear, concise lien law which would appeal to all parts of the United States. It is also hoped that the producers and manufacturers of materials for all kinds of construction will recognize that here is a field of endeavor which will assure new markets and untold extension of business. To-day all parts of the United States are open only to those few large producers or manufacturers who can afford to spend enormous sums in investigation and in the employment of legal talent familiar with the various lien laws. Can anyone imagine all the benefits which would accrue if every State in the Union had a uniform lien law which would practically be a guarantee of payment? Why should not this be one of the goals for some of the numerous organizations aiming to benefit the various classes now given protection by this special kind of legislation? The uniform sales law is chiefly beneficial to the courts and lawyers, and of only general interest to the layman. A uniform lien law would benefit and be of personal financial gain to every workman, every producer or manufacturer of construction materials; to every contractor, sub-contractor, foreman, superintendent, and even to engineers and architect. How long could any Legislature oppose a law which had the support of all these classes of people and of their various organizations? While it will require earnest, conscientious work for some considerable time before a comprehensive, satisfying, uniform lien law could be drafted, yet once it is prepared its general use would come almost as a matter of course. Who is going to start this good work and gain everlasting credit and honor thereby?

# Fire Prevention, and the High Cost of Living

## Vast Quantities of Grain and Other Staples Go Up in the Smoke of Unnecessary Fires

FEW people realize how directly the much discussed "high cost of living" is influenced by America's excessive fire waste. A recent nation-wide analysis of fires and fire causes has shown enormous destruction of common staples. Single fires in elevators and mills frequently consume the equivalent of a living for a small army of people. For example, a recent blaze in an Illinois elevator rendered 700,000 bushels of corn unfit for human food, and also destroyed 300,000 bushels of oats.

Grain elevators, flour, cereal, grist and feed mills present well known elements of fire hazard, in that they are subject to explosions of the highly explosive dust results from handling or milling grain. These disasters also cost many lives; a dust explosion in a Buffalo mill, in 1913, resulted in over thirty fatalities. A short time ago the United States Department of Agriculture made a study of the frequent explosions in grain separators in the Big Bend country of the Northwest, and found that in the height of the season these reached from six to ten a day, the flame from such explosions in a large number of cases spreading into the surrounding grain with destructive results.

Individual barn fires add enormously to this total. Throughout most of the country the season of thunder storms follows closely upon that of harvest, and thousands of barns, stored with potential food, go up in flames each year because of lightning. These fires must be classed as largely preventable, since statistics compiled by the Actuarial Bureau of the National Board of Fire Underwriters show that of the total fire loss from lightning, more than 92 per cent is found where lightning rods are not used.

The spontaneous combustion of hay and grain in poorly ventilated barns is another big factor which might largely be prevented by proper precautions.

### Vast Amount of Food Destroyed

When to such items are added the fires in grain fields from locomotive sparks, and from the matches of careless smokers, it may be realized that a vast amount of foodstuff is turned into clouds of smoke instead of human bone and muscle. This inevitably has its effect upon the price of the remainder.

Most people depend upon groceries for their food, and the average grocery, containing, as it does, stocks of kerosene and other inflammable merchandise, is a special instance of fire hazard. This is shown by the great number that are consumed during each year, and each grocery fire subtracts a definite quantity of staples from the national supply.

Meat supplies are directly affected by the large number of live stock burned in fires in barns and stables, and also by the many fires in packing houses, slaughter houses, etc.

The same condition holds true with other staples than those of food. In two years there were reported 822 fires in wool and cotton mills. Cotton is a commodity which is particularly subject to disastrous fires. This also applies in a marked degree to the refining, storing and handling of oil—one of our commonest daily requirements.

The supply of wood enters into many phases of our living necessities. In New York State alone 200,000 people are employed in turning out an annual product of nearly $400,000,000 in wood manufactures. Striking at the basis of this great industry, hundreds of human lives, and millions of dollars' worth of property are destroyed each year by forest fires, which might be prevented with proper care. The National Forest Service, in one year, discovered 1,126 forest fires to have been caused by campers; 1,110 by locomotive sparks, and 470 by incendiaries. The burning of saw mills, lumber yards, furniture and woodenware factories and stores is too frequent to call for special comment. Similar surveys might be made in other fields of staples included in the cost of living.

Back of all this loom the larger aspects of the situation. With an average of more than one reported fire for every minute of the year, and a daily destruction approximating $600,000, the United States is subjected to an economic drain that affects every detail of its business and social life, and is a large though unrecognized factor in the cost of commodities. Furthermore, it cannot be overlooked that a vast number of people are interrupted in employment, and hence in earning power, from the same cause.

It is at least an interesting coincidence that the historic panic of 1873 followed the Chicago conflagration of 1871, and that of Boston, in 1872; while the more recent panic of 1907 occurred in the year succeeding San Francisco's great fire.

If America were to reduce her fire losses to the fractional figures of most other countries it can hardly be doubted that the cost of living would be materially lowered. It must never be forgotten that 21.4 per cent of this annual bonfire is due to strictly preventable causes, 37.9 per cent to those which are partly preventable, and that the remaining 40.7 per cent from "unknown" causes is probably largely preventable.

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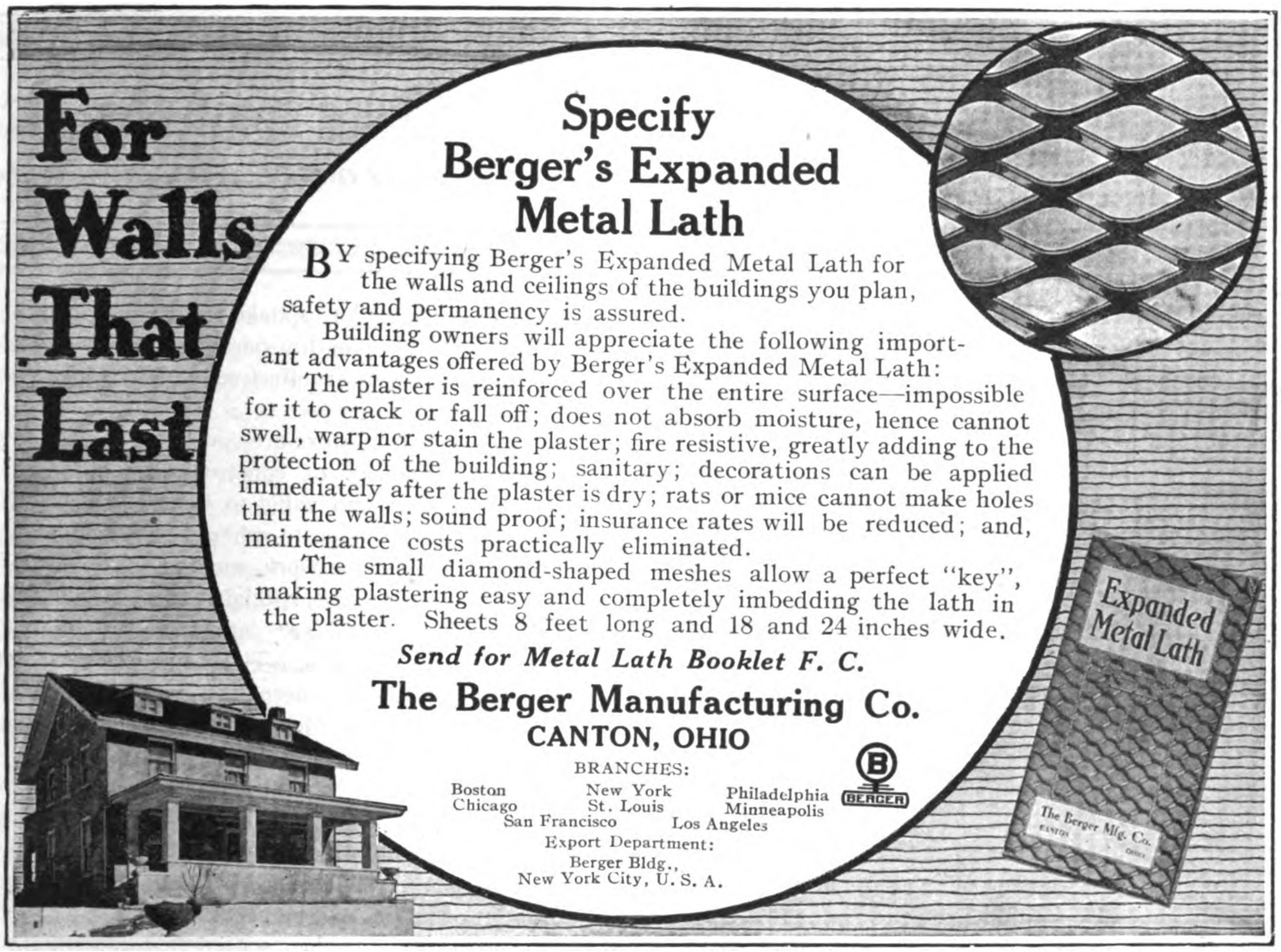
The direct economic effect of a fire loss (which resolves itself into an endless chain of smaller losses) is to place a burden of actual loss upon every individual who constitutes a unit in the group we call the nation.



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# A Roofing Bill Worthy of Enactment

THAT the general public is beginning to appreciate the serious fire menace to any community through the free use of wood shingle roofings is evidenced by the prohibitory legislation against the danger being adopted in cities and towns throughout the country. When legislation of this character is taken up by the different States, as it promises to be ere long, a great step forward will have been taken in the matter of fire safety.

We are quoting below a bill offered in the recently concluded session of the Texas Legislature. While the measure failed of enactment, assurance is felt that in somewhat amended form it will again be submitted, and with a fair prospect of its passage. That it is not relished by the lumber interests may easily be imagined. But powerful as are the lumbermen in the Lone Star State such legislation as that proposed in the bill must eventually come about.

The bill reads:

"An Act requiring the roofs of all buildings hereafter erected in cities of ten thousand inhabitants or over, in this State, and the side and tops of all dormer windows of all buildings hereafter erected on such buildings, to be constructed of tile, tin, slate or gravel composition, or such other non-combustible material as may be prescribed by the State Fire Marshal, and requiring repairs to the roofs of all buildings and dormer windows hereafter made or erected in such cities, exceeding 25 per cent of the cost of a new roof, to be covered with tile, tin, gravel composition or other non-combustible material as may be prescribed by the State Fire Marshal; fixing penalties for the violation of this Act, and declaring an emergency.

"Be it enacted by the Legislature of the State of Texas:

"Section 1. Each and every window and the tops and sides of each and every dormer window thereon, hereafter erected within the corporate limits of cities of ten thousand population or over, within this State, as shown by the last census of the United States, shall be covered and roofed with tile, slate, tin, gravel composition or other non-combustible material; provided that nothing in this section shall be construed as prohibiting the repair of any shingle roofs, where such repairs do not exceed 25 per cent of the cost of a new roof.

Sections 2, 3 and 4 provide for designation of non-combustible materials and for penalties.

# New Literature in the Field of Building Con-

*Reviews of Books, Catalogs and Other Literature Which Should Be*

### *"For the Generations to Come"*

IF not the first, this is certainly the best piece of business literature produced by the Vermont Slate Manufacturers' publicity bureau, Granville, N. Y., and by the slate industry as a whole, in an effort to set forth the virtues of Vermont Sea Green slate as a permanent and firesafe roof covering.

In general arrangement of text matter, typography, paper, etc., the booklet can easily hold its own among the artistic trade literature in any architect's office. In its 28 pages there are 31 excellent plates, five of which are in four or more colors. The booklet is 7 by 10¾ inches and is the work of the N. W. Ayer & Son advertising agency.

In speaking of the wood shingle roof the Vermont Slate Manufacturers' publicity bureau makes no bones about the dark record of such tinder box covering, but hues right to the truth in the following excerpt:

"In cities, the wooden shingle is a fire menace that is quite generally forbidden by the National Board of Fire Underwriters. In the country, away from fire protection, a wooden shingle roof is a grave and hazardous risk. For a single spark, whirled from out the chimney, of itself can start such a roof to blazing fiercely. * * * Insurance cannot compensate for loss. For insurance can but replace and substitute. It cannot restore."

Architects and others related to the building world, so long accustomed to the scanty and undignified printed matter generally sent out by slate interests, will, in a copy of "For Generations to Come," find surprise and satisfaction. Address Frank S. Fogg, manager of the bureau, for a free copy.

### *Concrete Highway Magazine*

THE January and February issues of *Concrete Highway Magazine*, a publication devoted to concrete roads, streets and alleys, published by Portland Cement Association, have been received in the editor's office. These are the first numbers of an exceedingly attractive and valuable monthly publication which should be received regularly by every person interested in any manner in road building, civic improvement and the bettering of traffic conditions. This publication will disseminate accurate information concerning concrete pavements for roads, streets and alleys.

Such information is constantly being obtained by the association. In order to make it available to those who can use it, this monthly periodical has been decided upon as the most effective medium for that purpose.

Engineers and contractors are constantly developing and observing features of construction which they have found to be of no value to themselves and, if known, would be of value to others. Thus any new device that facilitates the work, methods of organization to carry on a given job, special features or difficulties that have arisen, and cost data, are all of interest and should be made known. The sender of such information need not feel it necessary to put it in final shape for publication. With facts at hand the editorial staff will put the matter in proper form.

All who have such information are requested to forward it to the office. It will be printed over the sender's name or not, as he may desire. In either case the author will be advised of exactly the form in which the information will be used.

Illustrations will be made a special feature. Photographs of construction views and finished pavements will be appreciated and such as may prove available will be paid for.

In general it is the intention to make the contents of this magazine of immediate service to engineers and contractors and to include also matter of general value to all interested in road improvement.

### *Absolutely*

With this mysterious caption on the cover page the Dahlstrom Metallic Door Co., Jamestown, N. Y., is putting out a neat 14-page folder featuring a well-written article by the consulting architect, F. W. Fitzpatrick, of Washington, D. C., entitled "Real Fireproofing—Common Sense in Practical Application."

No time is lost by Mr. Fitzpatrick in footing his argument on a logical foundation. Following are a few of the opening lines:

"Of the 12,000,000 and more buildings we have in this country, there are only a few thousand in which any pretense at fire prevention or retarding at all has been made, and certainly not a hundred buildings that can rightfully be called absolutely fireproof.

"Granted that we have received such an inheritance of firetraps from our ancestors as to insure a continuance of a very heavy fire loss for years to come, still

*All literature described above is free of cost unless otherwise designated*

## struction, Fire Prevention and Protection

*in the Files of Every Architect, Contractor and Prospective Builder*

that loss is ever increasing, so that we must be adding combustible buildings at a pretty lively rate. As a matter of fact, throughout the entire country, fully 65 per cent of all the new construction done is of wood. Not at all surprising, therefore, that our actual destruction of property by fire equals in normal years $250,000,000—and such abnormal years as gave us the Baltimore and the San Francisco, the Toronto and the Boston fires, come with pretty startling frequency—to which must be added the cost of $300,000,000 for fire departments, water and such public and private protection. And on top of that we gamble with the insurance that our buildings won't burn up. We put about $300,000,000 into the jackpot in the way of premiums and get back in paid losses something like a third of what we pay in."

Mr. Fitzpatrick's argument is clear and forceful, one of the most logically pronounced architectural utterances we have heard for consistent firesafe building. That it is a forerunner of the day when architects will properly consider safety and utility as well as merely *artistic* goals, we do not doubt. First things in first place, and in building construction surely *fire-safety* should be among the first considerations in planning every type of structure.

Constrvction would like to see a copy of the Dahlstrom folder on the desk of every architect and every architectural student in the country.

### *Fire Protection in Factories, Stores, Etc.*

The bulletin sets forth in terse text, appropriately illustrated, the kind of precautions that are necessary to insure safety against fire. It says that fire protection means the following things: Carefulness and Cleanliness; Protection of Heating and Lighting Equipment; Putting Out Small Fires (the best extinguisher, the automatic sprinkler); Fire-Resisting Buildings; Proper Exits, and Fire Drills.

"It is mad business for any manufacturer or merchant to have a fire, or to run unnecessary chances of having a fire, because:

"1. The fire insurance rate is higher if the building is not properly protected;

"2. Fire means a big loss, in spite of insurance, because insurance does not cover loss of time, loss of profits, and loss of customers;

"3. If an employee is killed or injured by fire, the employer is liable under the Workmen's Compensation Act. Issued by Wisconsin Industrial Commission.

### *Protecting Your Factory From Fire*

Factory owners, superintendents, fire chiefs, maintenance engineers, and others who are interested in the question of fire prevention in industrial plants, will find Chief Guerin's book, "Protecting Your Factory From Fire," a mighty useful little book of reference. This manual has just been published by the Pyrene Manufacturing Company, 52 Vanderbilt avenue, New York City, and will be sent postpaid to any factory official for $1.

There have been many books written on fire prevention and fire protection—which, by the way, are two separate and distinct subjects—but, as Chief Guerin truly says, in a book they are generally of a too highly technical nature. Also they are frequently too voluminous for the busy factory man to spend his time reading. It takes him too long to get at the meat of the subject.

In this respect Chief Guerin's book will be found to meet all requirements. The subject has been boiled down to its most simple language. Without figures of speech the author goes right to the heart of the subject, giving his opinion of what is needed to be done to make the factory a safer place to work for the employees and factory stock a safer investment for the buyer.

Instructions are given in the organization of fire drills and fire brigades. There are chapters on fire prevention and fire protection, on housekeeping exposures, construction, etc. Each chapter is epitomized on a single page, giving the basic rules necessary to cover the subject.

A valuable chapter is that giving blank forms for the use of the watchman, inspector and for the fire chief to make on fires, fire drills, etc. Chief Guerin, the author, is an acknowledged authority on fire prevention. While he was deputy chief of the New York Fire Department he was chosen to organize the Fire Prevention Bureau of the City of New York, which has saved for the city many millions of dollars in reducing the fire loss, which has been cut down about 50 per cent since the organization of the bureau several years ago. Chief Guerin is chairman of the Fire Prevention Committee of the Safety First Federation of America, and his word carries a weight of authority.

*All literature described above is free of cost unless otherwise designated.*

# Barrett Specification Roofs

## In Grand Rapids, for instance—

In almost any American city—you can pick out any of the leading commercial buildings and say with fair certainty, *"That building has a Barrett Specification Roof."*

Take the city of Grand Rapids, for instance. Here are the four newest buildings: the new Bank, a new Wholesale Grocery, the new Y. M. C. A., and the new Hotel.

They all have Barrett Specification Roofs.

Most permanent buildings in the country carry this type of roof, and their popularity is not to be wondered at when you consider the following features:

***First:*** Lowest unit cost per year of service.

***Second:*** Guaranteed for twenty years, with a record which shows that they last much longer.

***Third:*** Freedom from maintenance expense.

***Fourth:*** Approved as "Class A" construction and take the base rate of fire insurance.

Tile, Slate, Shingles and Ready Roofings—all have their place on different types of steep-roofed buildings; tin is now rarely used for roofing. For all important commercial structures however the standard practise calls for Barrett Specification Roofs.

### Guaranteed for 20 Years

We are now prepared to give a 20-Year Surety Bond Guaranty on every Barrett Specification Roof of fifty squares and over in all towns in the United States and Canada of 25,000 population and more ***and in smaller places where our Inspection Service is available.***

This Surety Bond will be issued by the United States Fidelity and Guaranty Company of Baltimore and will be furnished by us ***without charge.*** Our only reqiurements are that the roofing contractor shall be approved by us, and that The Barrett Specification, dated May 1, 1916, shall be strictly followed.

**The Barrett Company**

***Largest Mfrs. n the World of Roofing and Roofing Materials***

New York Chicago Philadelphia Boston
St. Louis Cleveland Cincinnati Pittsburgh
Detroit Birmingham Kansas City Minneapolis
Nashville Salt Lake City Peoria Seattle
The Paterson Manufacturing Company, Limited: Montreal, Toronto
Winnipeg, Vancouver, St. John, N. B., Halifax, N. S., Sydney, N. S.

National City Bank, Grand Rapids, Mich
Architects: Williamson & Crow
Gen. Contractors: Hauser, Owen, Ames Co.
Roofing Contractors: Eikenhout & Sons Co.

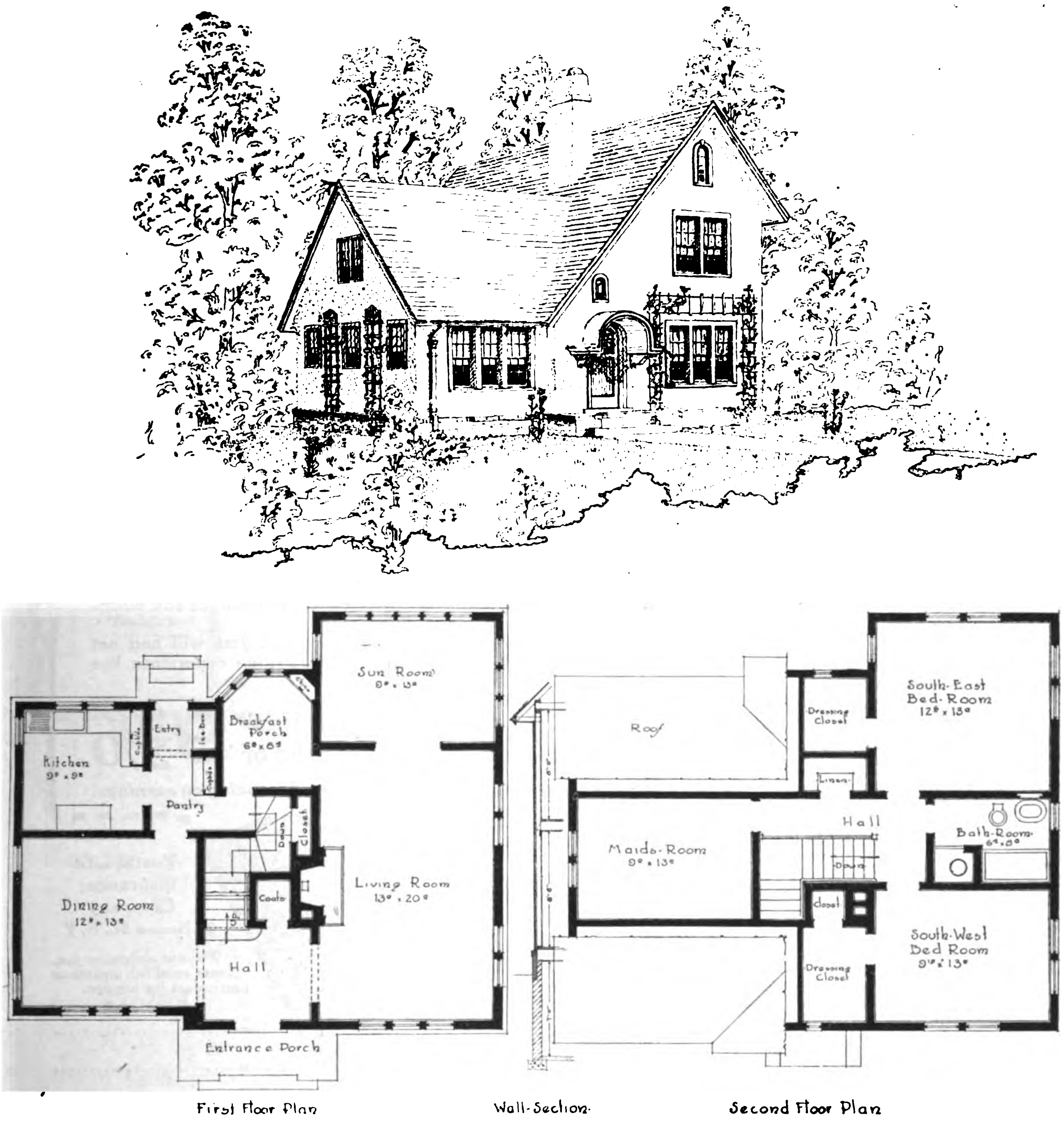
Caulfield Building, Grand Rapids, Mich.
Architects: Wernette, Bradfield & Mead
General Contractors: Horner & Kelly
Roofing Contractors: Eikenhout & Sons Co.

Y. M. C. A. Building, Grand Rapids, Mich.
Architects: Robinson & Campau
Gen. Contractors: Hauser, Owen, Ames Co.
Rfg. Contractors: Geo. Vander Broek Co.

Pantlind Hotel, Grand Rapids, Mich.
Gen. Con.: Fuller Construction Co., N. Y. C.
Rfg. Con.: M. W. Powell Co., Chicago, Ill.
Waterproofing Con.: Tuttle Rfg. Co., N. Y. C.

# SAFE HOMES

**Edited by RALPH P. STODDARD, Secretary**
**Society Advocating Fire Elimination**



***An Interesting and Attractive Type of Stucco Dwelling***

*Designed by W. J. Kraetsch, Des Moines, Iowa, and Built for* $4,147.

ONE of the designs submitted in the recent competition held in connection with the Second National Complete Building Exposition. A fire-safe exterior is provided by the use of stucco and shingles of the asphalt, cement or slate type. A spacious living room and sun room is provided, together with large entrance hall, dining, kitchen and three bedrooms. A unique feature is the attractive breakfast porch. Detailed costs will be supplied upon application to publication office.

*She:* "If we must cut down expenses, why not drop your life insurance?"
*He:* "Not much. That's *your* insurance, not mine. I figure we can trim about all the other items so as to save at least $400 a year, and I'm going to take a hundred of that and buy another Postal policy while I can get it. You and the kiddies may be glad some day."
*She:* (thoughtfully) "I guess you're right at that, Jim."

**Put Life Insurance in Your Family Budget —and Keep It There**

THE *real* husband always makes a liberal allowance for life-insurance whether his wife wants him to or not, but the sensible woman *does* want him to when she considers it seriously.

And whether times are hard or easy they both want the most protection possible for their money, and hundreds of them during the last decade have therefore been turning to the

**POSTAL LIFE INSURANCE COMPANY**

The Postal employs no agents but issues its policies direct. Agents' commissions and office-expenses are thus saved and go to its policyholders.

It is not alone the Company of Safety and Service but also of Saving, for you will find net cost low—lower than ever before—because the Postal's actual underwriting experience has enabled it now to make a

**10%** reduction in premium rates with a continuance of the annual guaranteed dividend of **9½%**

***Besides these savings, the Company pays the usual contingent dividends, depending on earnings.***

If you are in good health you should take advantage of the 10% reduction in premium-rates and other Postal economies.

**Find Out How Much *You* Can Save At Your Age**

on any standard form of Policy—Whole-Life, Limited-Payment Life, Endowment, Joint Life, or on a Monthly Income Contract.

The Postal issues all of the standard forms, and operates under the strict supervision of the New York State Insurance Department and is subject to the United States Postal authorities.

To get exact figures for your age, simply fill out the coupon and mail today.

Remember: No agent will be sent to visit you. The Postal Life employs no agents; resultant commission-savings go to *you* because you deal *direct.*

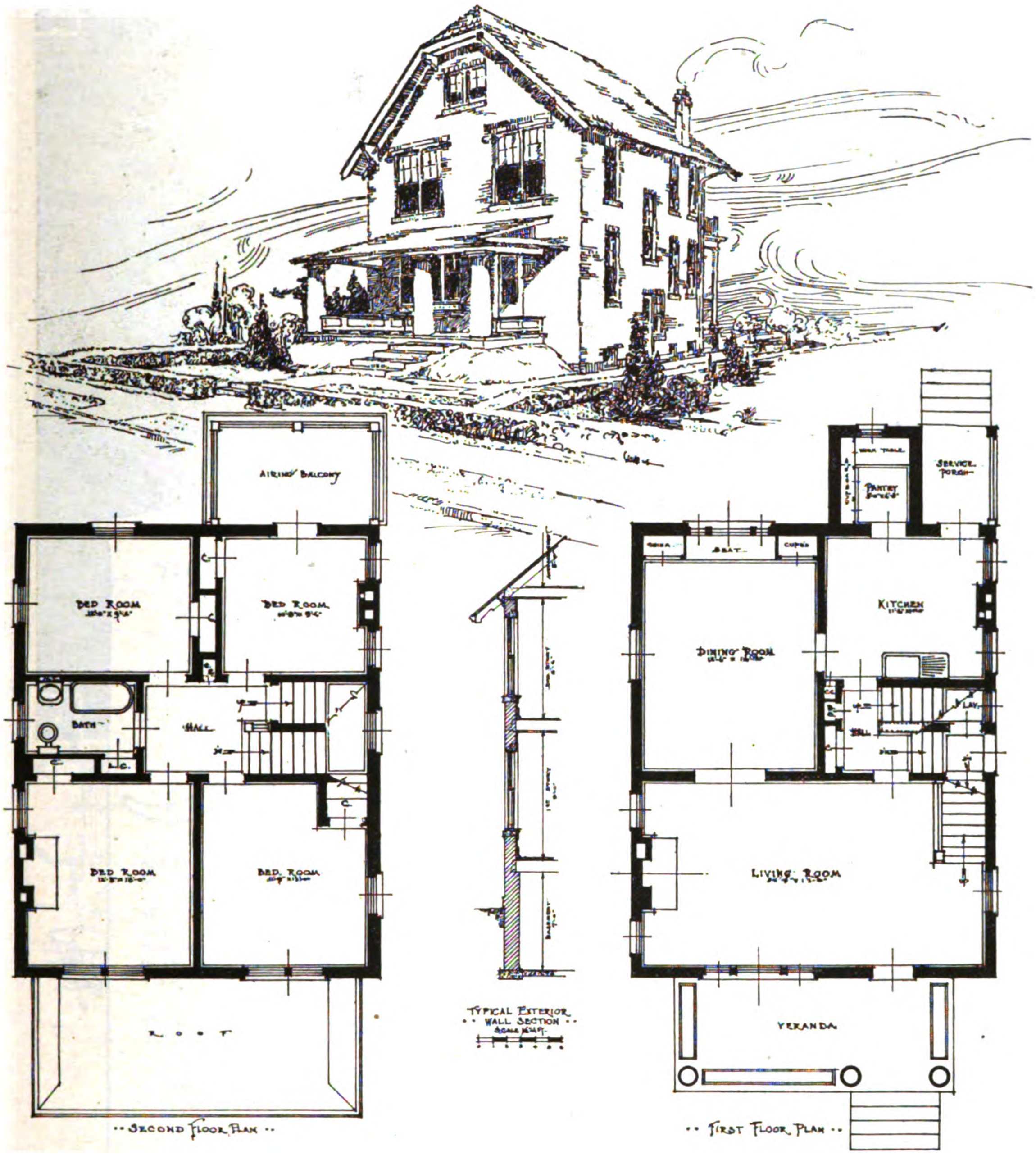
**POSTAL LIFE INSURANCE COMPANY**
WM. R. MALONE PRESIDENT
THIRTY-FIVE NASSAU STREET NEW YORK

Postal Life NY

**Postal Life Insurance Company**
**35 Nassau St., N. Y.**

Without obligating me, please send full insurance particulars for my age.

*Name* ..........................
*Address* ..........................
..........................
*Occupation* ..........................
*Exact date of birth* ..........................



***Monolithic Concrete With Unburnable Shingled Roof***

*Designed by C. Melvin Frank, Columbus, Ohio, and Built in That City at a Cost of* $4,816.

THE ground floor plan of this design offers an odd arrangement, but one which promises for comfort and convenience. The spacious living room is well lighted and equipped with a large open fireplace. A side entrance is provided, opening on the central staircase and to the cellar stairs. The small hall is carried up to the second floor and allows of entrance to the living room and kitchen on the first floor, and to the bedrooms and bath on the second floor. A lavatory is also provided at the side entrance.

The dining room is well lighted and equipped with a comfortable window seat. The kitchen is exceptionally large and well arranged, with pantry and serving porch convenient.

The second floor arrangement is practical and attractive. Four large bedrooms are provided, with ample closet space and an open fireplace in the largest. An airing balcony off one bedroom is a decidedly attractive feature and well worth incorporating in any similar design. Unit costs on application.

View in John Taylor Store, Kansas City

ZAHNER

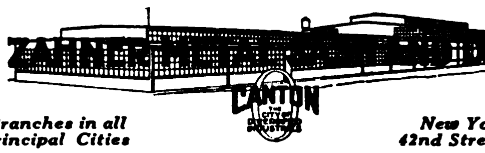
When Architects Holabird & Roche designed the John Taylor Store in Kansas City, they insured the comfort and safety of the store's patrons, reduced the fire insurance premiums, cut down the upkeep cost of the building considerably and added to the appearance of the interior all at one and the same time by specifying Zahner Hollow Metal Doors, Trim and Elevator Enclosures which were subsequently installed throughout.

The view reproduced above, showing a battery of the elevator enclosures is of particular interest.

Selden Brick Construction Co., contractors.

*When may we have the pleasure of estimating on one of YOUR buildings?*

The
Zahner Metal Sash
& Door Co.
Canton, Ohio

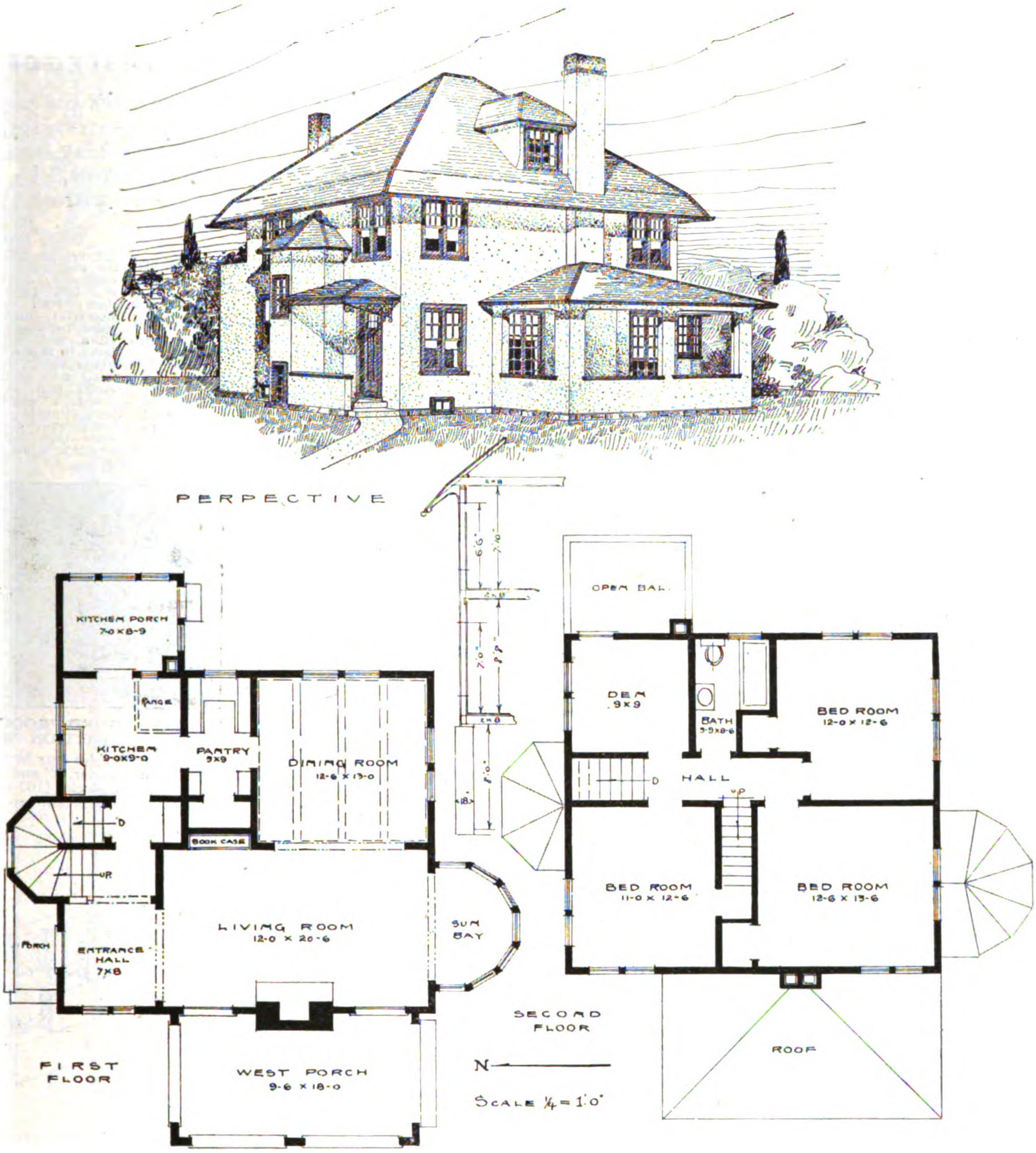


**THE ZAHNER METAL SASH AND DOOR CO.**

CANTON

*Branches in all Principal Cities*

*New York Office*
*42nd Street Building*



## *Stucco and Firesafe Shingles Attractively Used*

*Designed by Shelby H. Kurfiss, Kansas City, Mo., and Built in Kansas City at a Cost of* $5,315.

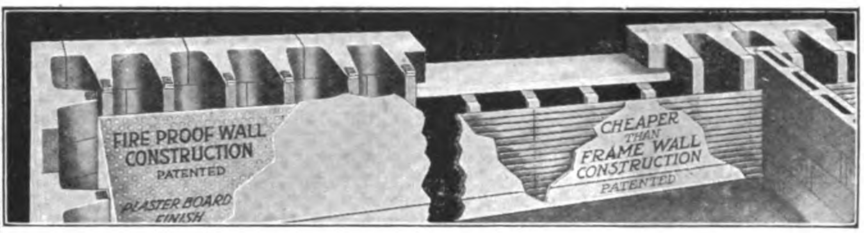
ON studying this design one is immediately impressed by the excellent lighting which has been provided and by a realization of the effect of permanency resulting from the use of concrete or stucco.

From the entrance hall, the full-width doorway opens into a spacious living room having a large open fireplace and an interesting feature in the form of a seven-windowed sunny nook, the sun bay. This allows a flood of light to enter the living room, which is still further lighted by two large windows opening out on a large porch, and by the widely-arched entrance to the dining room. The dining room is of comfortable size, with beamed ceiling and Dutch shelf.

The use of monolithic construction for porches, with square pillars and solid rail, carries out the effect of permanency and harmonizes well with the general design. This is a type of house which may be made exceedingly attractive or ugly, depending on the selection of the color tone for roof and side walls, as well as the painting of the window sash and ledges. Landscape gardening would have a material effect on the æsthetic quality of this house. Unit costs may be had from the publication office.

# Synstone Products *The Last Word in Concrete Construction*

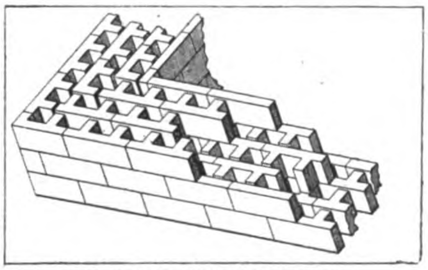
Wet Process, making real concrete walls impervious to heat, cold and moisture, fire proof and everlasting. Hollow Concrete Walls, stronger than brick, faced with beautiful natural materials—crushed granite, marble or sands—with all the sparkle and life of natural stone. Brick or stucco facings may be used if desired. Blocks immediately removed from machine using a wet, soggy mixture 1 cement, 2½ sand, 4 parts of 1″ stone or gravel—producing stone withstanding 3,000 lbs. pressure per square inch and 1700 degrees of heat for two hours without injury.


FIRE PROOF WALL CONSTRUCTION
PATENTED
PLASTER BOARD FINISH
CHEAPER THAN FRAME WALL CONSTRUCTION
PATENTED

**50 blocks (100 sq. ft. of wall) made per hr. 30 to 75 sq. ft. laid per hour by one mason, two helpers.**

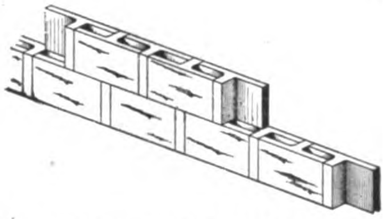
**Average cost per square foot of wall made and laid unfaced 11.4c faced 12.7c.**

**Synstone Single Wall for residences and any three-story construction, 9″, 10″, 12″ or 13″ thick. Half as much material and labor used in making, less than half as much time in laying, as any other wall. Inner wall wood lath and plaster, metal lath or plaster board. 9″ wall 50% hollow; stronger than 12″ brick wall, costing no more than frame construction in most places.**



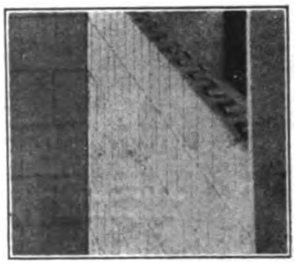
MULTIPLE AIR SPACE WALL

Synstone Wide Wall Construction (multiple air space). 50 blocks (100 sq. ft.) made per hour. **Ideal construction for cold storage or packing houses. 19½″ to as many feet in thickness, as desired. Absolutely impervious to heat.**



DOUBLE HEADER PARTITION WALL

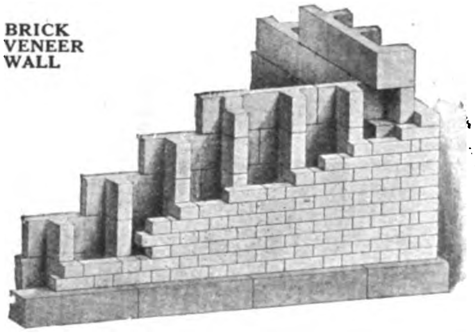
3″ to 12″ in thickness. Strongest masonry wall that can be constructed. **50 blocks (100 sq. ft. or 50 sq. ft. of wall) made per hour.**



**DOUBLE SOUND-PROOF PARTITION WALL**

**One or both sides may be faced, requiring no plaster, 4″ and up in thickness. 50 blocks (100 sq. ft. or 50 sq. ft. of wall) made per hour.**

BRICK VENEER WALL

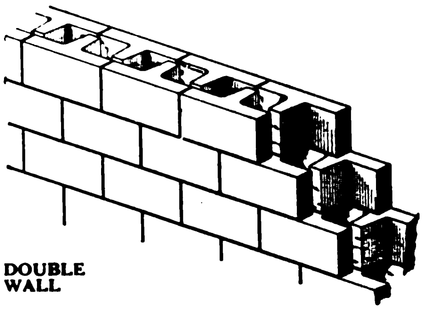


**50 blocks (100 sq. ft. of wall—inner wall) made per hour, and laid in one-third the time required for brick.**

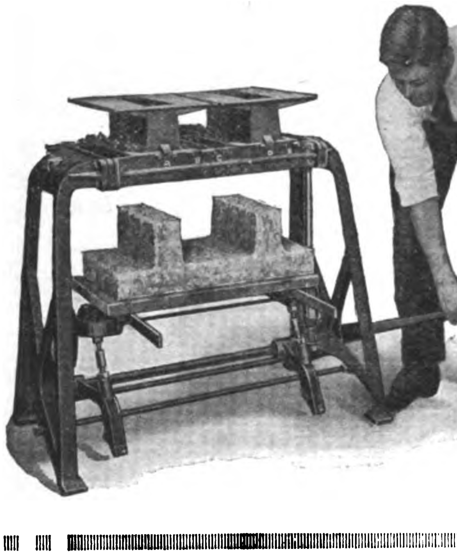
Synstone Inner Wall, with pressed or art brick facing, bonded together with header bond. Large saving in cost over solid brick construction, 12½″ or 16½″ thick.

**50 blocks (100 sq. ft. or 50 sq. ft. of wall) made per hour.**

Synstone Double Wall, for heavy construction, 11½ to 18″ in thickness, 33⅓% to 50% hollow. Large saving in cost over brick walls.



DOUBLE WALL

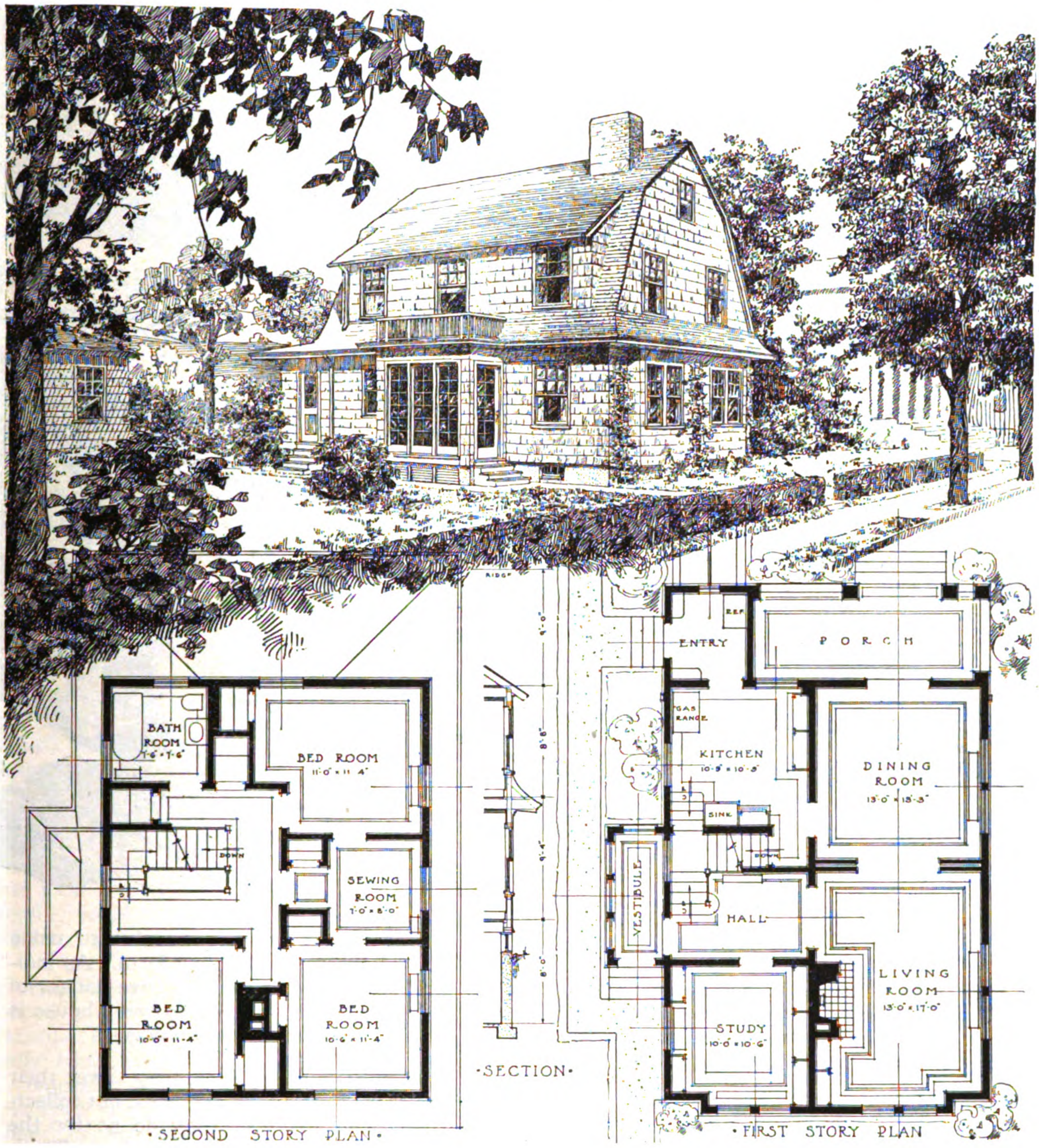


SYNSTONE MACHINERY is very carefully made and thoroughly complete in every detail, making all these walls and the different shapes and sizes of blocks required for them, by simply changing the cores, which is done in thirty seconds. Operated by common labor, 1, 2 or 3 men. Above estimates (50 blocks, 100 sq. ft. per hour) are based upon 2 men with mixture supplied to them.

PLANT. Just as good and beautiful material can be made in a shed as in an expensive factory. Do not let your material freeze or dry out. Keep moist for two weeks, when it is ready for the wall. Complete machinery C. I. F. New York $287.50, no royalty.

## The Ferguson Synstone Company

**Century Building, Denver, Colorado, U. S. A.**
**Cable Address: "SYNSTONE" Denver. Code—Western Union.**
**REFERENCES: Dun or Bradstreet Commercial Agencies or United States National Bank, Denver.**



***A Type in Which Cement Blocks and Firesafe Shingles May Be Used to Advantage***

*Designed by William Howard Smith, New York City, and Built at Woodhaven, L. I., at a Cost of* $4,500.

IN this interesting design a living room with large open fireplace, a comfortable study and a well-lighted dining room are provided. The glass-enclosed vestibule opens into the entrance hall, from which a short flight of stairs leads to the central staircase and a wide doorway provides entrance into the living room. The relative arrangement of the kitchen and dining room is excellent, allowing easy passage from one to the other, and designed to save many steps.

The large enclosed porch at the rear can be used as an attractive breakfast room. The upstairs arrangement is excellent, providing three good-sized bedrooms, one with an open fireplace.

The sketch of this house shows a shingled effect, but the use of concrete blocks would result in a firesafe exterior and one which would give far more satisfactory results in the matter of maintenance, while the cost would vary little. The matter of selecting concrete blocks is one which should be given very careful attention, as there are on the market types which are most unsatisfactory. If the block-making machines are obtained by the builder from a nationally-recognized manufacturer there can be little doubt of satisfactory results.

Roofing on this house may be of asbestos-cement, slate, asphalt or metal shingle type.

JOHNS-MANVILLE
Service in Fire Prevention
How safe is your town above the cornice line?
BANK

FROM the sidewalk, most towns look satisfyingly safe. On every hand we see evidences of it, in regulated traffic, police on duty, adequate street lighting, fire hydrants and fire stations that house modern extinguishing apparatus.

But a balloon view of that town might look different—less safe. And this is the point of vision that fire takes when it looks over a town and figures out a raid. Fire sees the town above the cornice line and plots its course from one inflammable roof to the other.

So it is the community's roof that determines its safety from fire and it is largely the individual's choice of a roofing that determines the fate of his property in a community fire.

All over the country people are using J-M Asbestos in Roofing form. As individuals they realize the grave danger of the community fire—that every house is a menace to every other house.

Selfishly, if you please, they cover their own roof with J-M Asbestos, but collectively and in effect they do so for the common good—for public safety. There is a Johns-Manville Asbestos Roofing for every type of building as the list below will show.

For flat roofs, J-M Asbestos Built-Up Roofing; for sloping roofs, J-M Flexstone Asbestos Roofing; for skeleton framing, J-M Corrugated Asbestos Roofing; for homes, J-M Transite Asbestos Shingles.

*J-M Asbestos Roofings are examined, approved and labeled by the Underwriters' Laboratories, Inc., under the direction of the National Board of Fire Underwriters.*

**H·W·JOHNS-MANVILLE CO.**
NEW YORK CITY
*Branches in 54 Large Cities*

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

WEATHER:
Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

# The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

Copyright by Construction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., March, 1917 Priceless

## NEEDS TO REVISE ITS BUILDING LAWS

Wilkes-Barre, an important city in the anthracite coal mining region of northeastern Pennsylvania, is in serious danger of sweeping fires, in the opinion of capable observers, and for the following reasons:

"In the congested value district construction is weak; there are many unprotected mutual exposures and numerous large and excessive areas; streets are narrow and blocks are very large; there are many accumulations of combustible rubbish and much overhead wire obstruction, and the fire-fighting facilities are inadequate, so that although heights are mainly moderate to low, and accessibility is good, the Public Square offers a fair fire break and the few fireproof and sprinklered buildings constitute local fire barriers, a fire could readily involve a large part of the district under certain conditions.

"The manufacturing plants are not grouped and constitute only a local hazard. Residential sections are mainly frame and in some instances compactly built, and with the prevalence of shingled roofs the danger of sweeping fires is moderately high."

### WINDOW OPENINGS TO BE PROTECTED

To meet the existent danger it is recommended among other measures: "That the building code be revised to conform more fully to modern requirements for construction and fire prevention, especially as to limitation of heights, protection to exposed windows and vertical openings and requirements for automatic sprinkler installation.

"That incombustible roof coverings be required on all new and repaired roofs throughout the city."

To safeguard especially against the conflagration hazard it is urged:

"That the owners of existing defectively constructed buildings which are located so as to form conflagration areas be required to suitably protect roof, party wall and exposed window openings.

"That automatic sprinkler requirements with outside siamese hose connections and controlling valves near main in street be required in all buildings which, by reason of their size, construction or occupancy, singly or combined, might act as conflagration breeders."

◆

## TIN ROOFING BEING PUSHED IN PHILADELPHIA

Manufacturers of tin plates are aggressively making known to the architects, contractors and property-owners of Philadelphia the merits of their product for roofing purposes. An extended advertising and circularizing campaign is being conducted, and follow-up booklets will go to each prospect. Before the special effort now being put forth shall have been concluded, it's a safe assertion that tin roofs of the proper type will be far more extensively used in and about the Quaker City than they have been heretofore.

◆

## BRICK TO BE PUSHED IN NORTHWEST

Determined that the merits of their products shall not be hidden under a bushel, manufacturers and dealers in face brick have organized the Northwest Face Brick Association, and will shortly begin a publicity campaign in Minneapolis and St. Paul. The idea is an excellent one, and intelligently carried out is sure to produce gratifying results.

Lumbermen have been alert to the advantage of proper advertising and have set an example in this respect that manufacturers of firesafe building materials would do well to follow generally.

## PERSONAL LIABILITY FOR FIRE DAMAGE

Under a recently enacted statute residents of South Dakota are liable for damages resulting from fires originating upon their premises and communicated to the property of others. The legislation is patterned after that in vogue in various countries of Continental Europe, where its strict enforcement has contributed not a little in keeping down the fire waste of the Old World.

The reasonableness of such a statute cannot be challenged, and its enactment by South Dakota is sure to be followed by that of other States, for it is only by making the responsibility for fire direct that our people will ever be made to realize the criminality of fires, and will adopt the use of materials in their buildings that, if not wholly fireproof, will at least be fire resistant.

◆

*The open mind recognizes no closed season for facts.*

◆

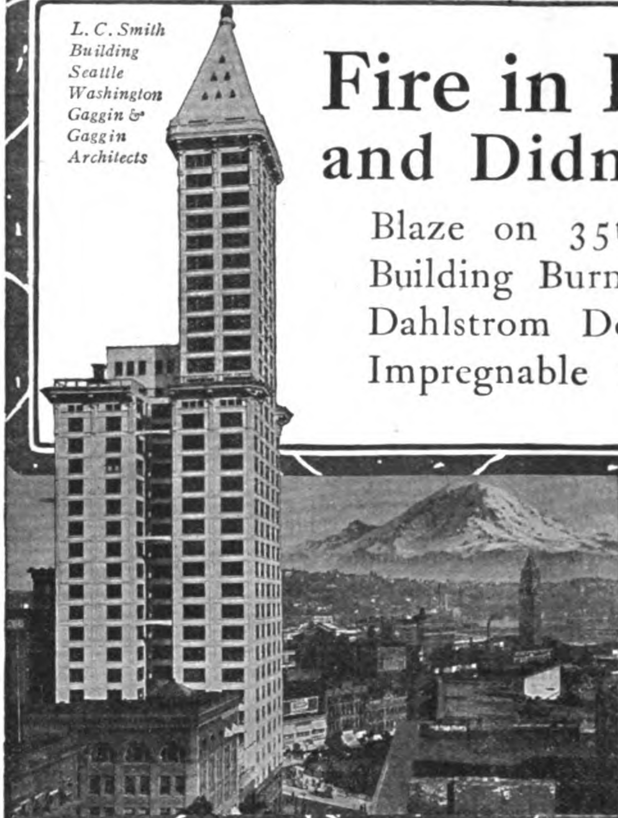
## SPARKS ON WOOD SHINGLE ROOFS

In the months of December, 1916, January and February, 1917, 416 fires occurred in Kansas City, Mo., directly traceable, according to the local fire fighters, to sparks falling upon combustible wood shingle roofs. No wonder there is insistent demand that this dangerous form of roof covering be prohibited, and that the matter is being very earnestly considered by the Kansas City authorities.

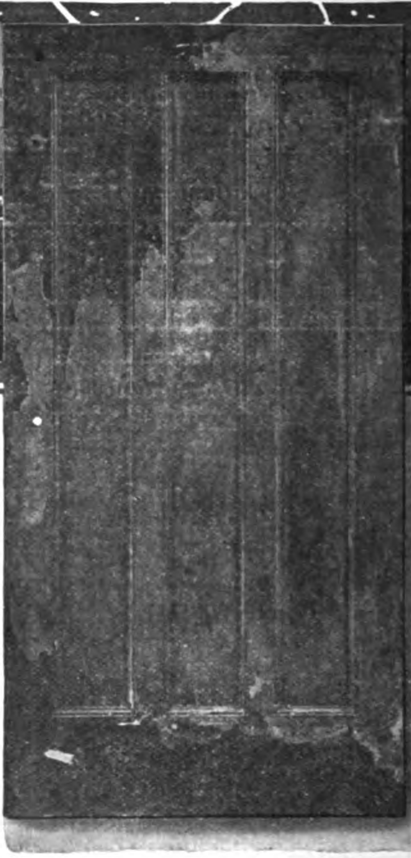
◆

## GLASS BRICK MANUFACTURING CO.

Under the management of Edward Ferger, the Glass Brick Manufacturing Company of Cincinnati, Ohio, has opened offices in the Terminal Building, Park avenue and Forty-first street, New York City, and will energetically make known the merits of its product to the building fraternity of this important territory.



*L. C. Smith Building Seattle Washington Gaggin & Gaggin Architects*



Fire in Pipe Shaft and Didn't Know It

Blaze on 35th Floor of This Building Burns Out Unnoticed. Dahlstrom Door Again Proves Impregnable to Raging Fire.

Door Finish Only Damage
Reverse Side Unblemished

Gasoline, oil soaked waste, brooms, brushes and other inflammable material burned behind this door unnoticed, damaging only the side exposed to the flames as shown.
The janitor upon opening the door was surprised to find everything consumed. The wall tile showed effect of excessive heat. Draft in shaft intensified matters.
Quality as related to Dahlstrom Doors implies more than a good looking door of metal. Dahlstrom Quality is established on the basis of dependable service in the emergency of fire.
Your responsibility ends with the installation.

*Write for all the facts.*

DAHLSTROM PATENT DOOR ARTISTIC EVERLASTING SANITARY AND FIREPROOF

THE DAHLSTROM METALLIC DOOR CO.
Executive Office and Plant, 61 Blackstone Ave., Jamestown, N. Y.
New York Office, 130 East 15th Street

### AMERICAN CERAMIC SOCIETY ELECTS NEW OFFICERS

George H. Brown, director of the Ceramics Department of Rutgers College, New Brunswick, N. J., is now president of the American Ceramic Society, having been so elected at the annual meeting of the organization, held in New York City, on the 5th of the present month.

Other officers chosen include: C. Edward Jackson, vice-president; Edward Orton, Jr., secretary; Ralph Kent Hursh, treasurer.

◆

### JOHNS-MANVILLE MOVES INTO NEW QUARTERS AT LOUISVILLE

After March 15 the Louisville branch of the H. W. Johns-Manville Company will be located at the corner of Fourth avenue and Guthrie street, Louisville, Ky., in the new building erected by the Speed Realty Company.

This building provides a frontage on Guthrie street, which is in the very center of the retail district of Louisville.

A. H. Voigt will be in charge of the office and will have under him a corps of salesmen who in these new and large quarters will be able to give even bigger and better Johns-Manville service to the buying public of Louisville and surrounding country that has been the practice heretofore.

◆

The most important South African cement company, the Pretoria Cement Co., Ltd., producing more than 400,000 casks per annum, is now engaged in erecting an additional large factory in the Mexico district, near Mafeking. All the important machinery is on the site. It is planned to produce cement about July or August of this year.

◆

The A. T. Small Brick Co., Macon, Ga., in order to produce concrete tile roofing, has purchased from the Walter Concrete Machinery Co., Indianapolis, Ind., a six-machine plant. It is also planning to establish a concrete tile plant at Atlanta.

◆

Polk-Genung-Polk Co., originators of the Polk system of reinforced monolithic concrete construction, will open a new office in Chicago in Booths 133 and 134, second floor, Insurance Exchange Building, 175 West Jackson Boulevard, in the Permanent Building Material Exhibit.

◆

### 1916 RECORD YEAR FOR LIME

G. F. Loughlin, of the United States Geological Survey, Department of the Interior, in an estimate of lime produced and sold in the United States, Porto Rico and Hawaii in 1916, indicates a total marketed production of 4,150,000 short tons. This is a gain of almost 15 per cent over 1915's record, which was 3,622,810 tons. Of the 43 States in which lime was produced and sold, 31 reported increase. The remaining States represent less than 6 per cent of the total quantity produced.

Hydrated lime in 1916 showed an even more impressive increase than total lime, the marketed produce running up to 710,000 tons, a gain of over 13 per cent. All States producing 5,000 tons or more showed increase.

◆

The Cement Gun Company announces a $100 increase on the price of all cement guns, taking effect May 1, 1917, and due to the increased cost of raw materials and parts not manufactured by them.

◆

Jeffersonville Cement Tile Company, formerly Cement Floor Tile Co., Louisville, Ky., increased capital stock from $20,000 to $40,000.

W. G. Mitchell Lumber Co., Shortleaf, Ala., has purchased the Alabama Portland Cement and Lime Company's plant at Demopolis, Ala. A new company will be organized.

Jefferson Cement Tile Co., 53) Franklin Street, Louisville, Ky., will operate plant with daily capacity of 300 square feet cement tile. P. L. Atherton, president; S. W. Greene, vice-president; E. D. Miller, secretary; S. W. Graves, treasurer and manager.

◆

*Can a convention platform be called a "hot air blast"?*

◆

*It would be a better world if every man had to pay storage charges on all the useless thoughts he has stored in his attic.*

Ironclay Brick Company, Ruggery Building, Columbus, Ohio, has closed a contract to sell entire output of the Conrad-Hallwood Brick Company, a new concern of Columbus. The 1917 output is estimated at 15,000,000 common brick and hollow tile.

◆

Houstan Bros.' Company, Pittsburgh, Pa., are reported to be after a clear title on land near Kittanning, Pa., on which it is planned to erect a brick plant. The acreage is about 100. If title is secured the company expects to expend $200,000 to construct a modern brick factory.

◆

Press reports state that business men of the Hazen, N. D., Commercial club plan the establishment of a brick manufacturing plant in that city.

◆

Board of Education, Pittsburgh, Pa., will not proceed with the $1,000,000 worth of school construction for at least a year, the reason being the high cost of building material.

◆

Acme Brick & Sand Co., Milwaukee, Wis., has changed its name to Acme Brick Co. Additional machinery will be installed to increase the capacity to 10,000 brick per day.

◆

Wheeling Tile Co., Wheeling, W. Va., has increased its capital stock from $150,000 to $300,000.

◆

Kansas City Brick Co., Kansas City, Mo., recently incorporated, has started construction of a plant at Vale, Mo. B. W. Ballou, of the Kansas Buff Brick Co., Buffville, Kan., is president.

◆

*Business comes to he who knows his business.*

◆

*When he worked at all, Rastus devoted himself to the arduous task of trading horses. One evening Mandy rushed into the room, saying excitedly: "Rastus, I heerd to-day dat Sam Johnson wants to buy a horse." But her husband did not appear elated at the prospect of a customer. He said with a yawn: "I know. He wants a cheap horse and I haven't anything under $15."*

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TRADE MARK REGISTERED

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# The Fireproofing News

## TRADE NOTES

Texas Lockjoint Cement Silo Manufacturing Co., Niles City, Tex., will rebuild its plant.

Wisconsin Clay Manufacturers' Association will hold its next convention at the Republican House, Milwaukee, Wis., February 1, and 2. S. Weidman, secretary, Madison, Wis.

J. J. Mandery Company have transferred a large tract of ground to the American Clay & Cement Corporation for a price said to be $100,000. The new owners now occupy the property and, according to John E. Maher, vice-president, it will be one of the best equipped supply yards in the United States.

F. W. Bryson, formerly superintendent of the Hydraulic Press Brick Company's Porter, Ind., plant, has accepted the position of superintendent of the large plant operated by the Arkansas Brick & Tile Co., Malvern, Ark.

Secretary Howard M. Nichols, Associated Roofers of America, announces a most satisfactory volume of business for the year just closed. His association now operates in seventeen States.

Standard Scale & Supply Co. have moved Philadelphia office, warerooms and service department from 35 South Fourth Street, to 523 Arch Street, the building having a depth of nearly 300 feet through to Cherry Street.

National Moorish Tile Manufacturing Company, Connersville, Ind., will erect a plant to make floor tile for office buildings, hospitals, post offices and other public structures. E. P. Hawkins is president, Charles A. Rieman vice-president, Marion K. Jemison treasurer, Ward Halliday secretary and general manager.

Easton Brick & Tile Company, Easton, Md., is planning extensive improvements, one being installation of several new kilns. Frank A. White is manager.

Grand Rapids Brick Company, Grand Rapids, Mich., plans to increase its kiln capacity from 175,000 to 300,000 brick. It also plans to start a sand-lime brick plant to be worked with its clay plant.

Birmingham Slag Company, Birmingham, N. Y., and Buffalo, N. Y., plans to spend $75,000 to erect an immense crushing plant to produce crushed materials for construction work and other purposes. C. E. Ireland is sales manager.

Liberal Impervious Brick Company, Liberal, Mo., incorporated with capital of $60,000 to manufacture brick.

Ancho Brick Company, Ancho, Lincoln Co., New Mexico, has been incorporated, with a capital stock of $450,000, and will erect a large brick plant at above place. Incorporators are: J. E. Morgan and John Franklin of El Paso; O. V. Rye and S. W. French of Douglas, Ariz.; M. Earl of Des Moines, Ia.; S. Heyfirle of Ancho, and T. H. O'Brien of Dawson, N. M.

Southern Cement Casket Company, Baltimore, Md., plans erection of factory, with capacity of 100 monolithic cement burial caskets.

National Roofing Tile Company, Lima, Ohio, will be reorganized to manufacture fire-proofing materials, also hollow brick.

Barkwill-Farr Brick Company, the new $4,000,000 concern of Cleveland, Ohio, will erect a large brick manufacturing plant on a newly acquired site of 50 acres on Bradley road, purchased from the Kirk-Christy Company.

Conard-Hallwood Brick & Tile Company, Columbus, Ohio, has started its large plant near Seventeenth and the Big Four tracks. John Conard is general manager.

Thomas Moulding Company will open office in Columbus, Ohio, to handle brick and clay products. Home office is at Chicago, Ill.

Petersburg Fire Brick & Tile Company, Coal Grove, Ohio, will erect two large brick kilns. John Peters is general manager.

William Florey Brick Company expects to operate new plant at Lansdale, Pa., after the new year.

Standard Cement Construction Company, Southern Building, Wilmington, N. C., incorporated with capital stock of $15,000. G. A. P. Bowman is president, Chas. O. O'Neal vice-president, J. D. Walter, Jr., secretary, J. B. Davis, manager.

Rockcastle Cement & Lime Company, Pine Hill, Ky., chartered with capital of $1,500,000 by Robert S. Maslin, 1025 Munsey Building, Baltimore, Md., and others.

Fero Brick Company, Watsontown, Pa., will erect two new kilns.

Builders' Co-Operative Brick & Tile Company, organized at Nazareth, Pa., with capital stock of $15,000. Harry J. Overstock, Easton, Pa., is treasurer.

Clay Products Manufacturing Company, Philadelphia, Pa., has been incorporated, with a capital stock of $100,000 by F. D. Buck, M. L. Horty, and K. E. Longfield, latter from Wilmington, Del.

Gilmore Fire Clay Company, Pittsburgh, Pa., incorporated with capital stock of $50,000. A. L. Gill, C. A. Bursner and D. E. Mitchell are incorporators.

Meteor Brick Company, Johnstown, Pa., will build a plant at that point. H. Silverstein, C. J. Burkhard, T. J. Caliet, M. Burney, John Burkhard and W. J. Willis are incorporators.

Philipsburg Clay Product Company, Philipsburg, Pa., will build a large plant to make face-brick. The yearly payroll will amount to about $80,000.

Star Clay Products Company, Elmendorf, Tex., is adding a new kiln, which will increase capacity 50 tons a day.

Municipal Shale Brick & Block Company, Martinsburg, W. Va., will erect an additional plant.

Superior Tile Company, Rosslyn Village, Ontario, Canada, is now operating its plant, turning out 35,000 brick per day.

The Dodge Metal Hose Company, Galt, Canada, will erect a $50,000 plant. Following Toronto business men are officers: William Lennox, president; Harvey O. Bee, secretary-treasurer.

Saskatchewan Clay Products Company, Moose Jaw, Saskatchewan, Canada, in order to increase its output, has advanced its capital from $300,000 to $500,000. The company will double its manufacturing operations and plans the formation of a colony of Belgian ties.

◆

*Success is the successor to preparation.*

◆

*Those who cannot run generally run down.*

◆

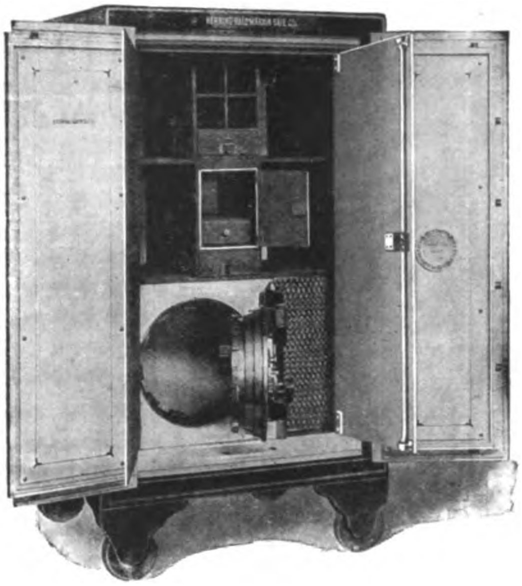
*Nothing stays up to date unless kept up to date.*

◆

*Reading blueprints is like reading diplomatic documents—everybody interprets them according to his own ideas.*

HERRING-HALL-MARVIN SAFE COMPANY

*Designers and Manufacturers of*



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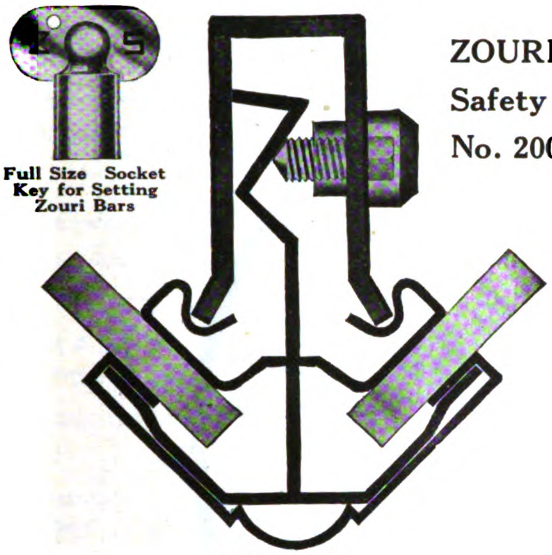
# ZOURI

## Safety Store Front Construction

**Full Size Socket Key for Setting Zouri Bars**



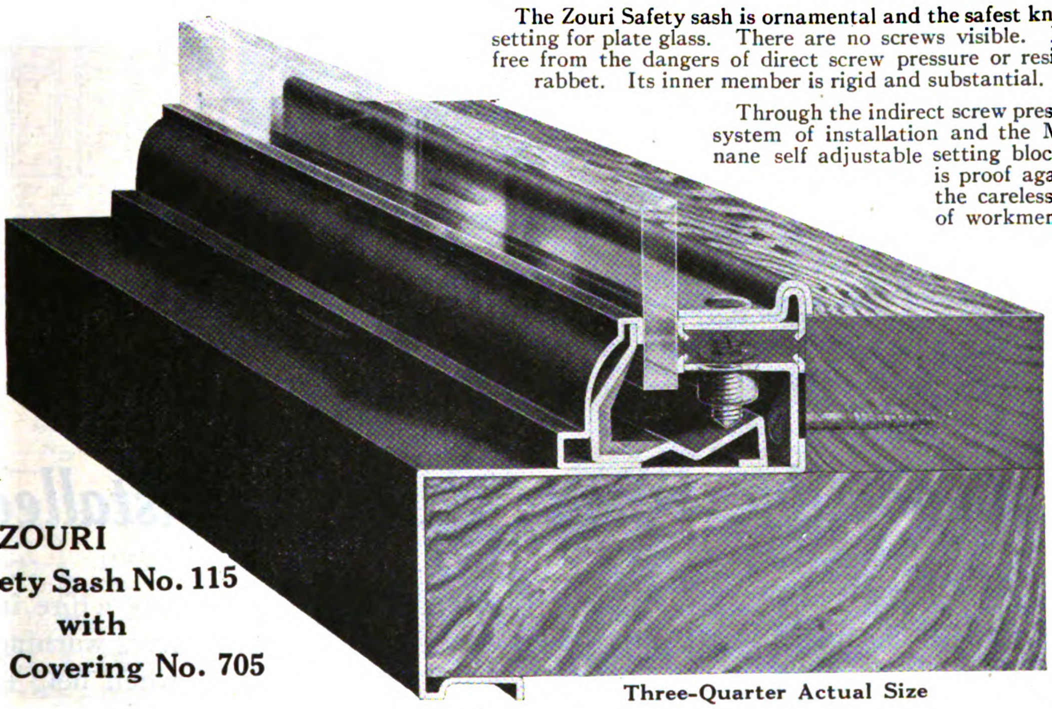
FULL SIZE

### ZOURI
### Safety **Key-Set Corner Bar**
### No. 200

Zouri Safety Key-set Corner and Division Bars are free from direct screw pressure. They are proof against the carelessness of workmen. They can be set only with the small special socket key shown, so that undue pressure cannot be exerted by the tools used in the building line, the power of which is beyond control. These bars are specially constructed so that the edges of the glass **cannot** come in contact with the metal.

The Zouri Safety sash is ornamental and the safest known setting for plate glass. There are no screws visible. It is free from the dangers of direct screw pressure or resilent rabbet. Its inner member is rigid and substantial.

Through the indirect screw pressure system of installation and the Murnane self adjustable setting block, it is proof against the carelessness of workmen.



**ZOURI**
**Safety Sash No. 115**
**with**
**Sill Covering No. 705**

Three-Quarter Actual Size

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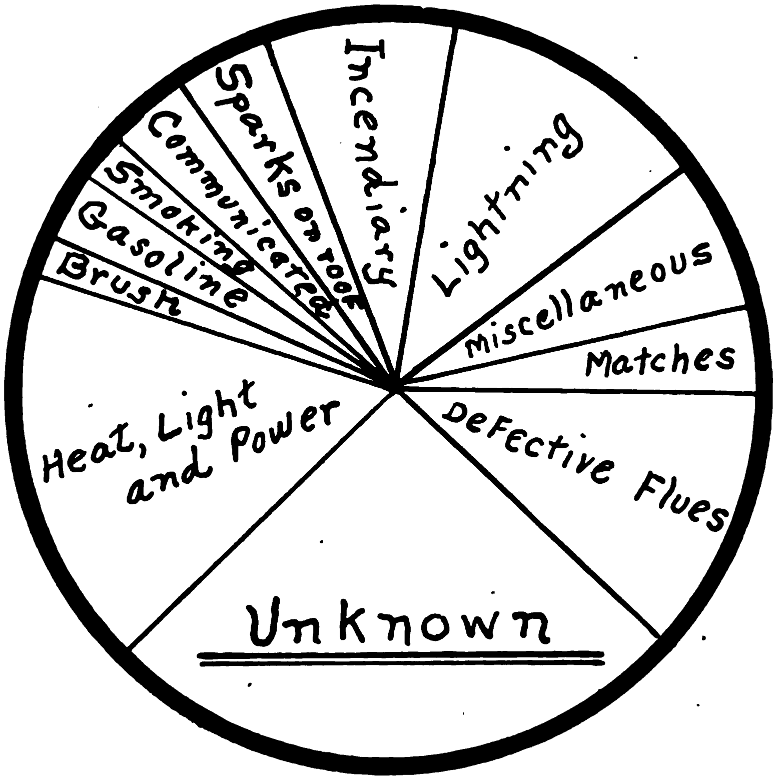
# "Fires of Unknown Origin"



*The above graphic chart illustrates the ratio of destruction by fires of unknown origin to the total amount of fires in the State of Wisconsin during the year ending June 30th, 1915, as shown by the report of the State Fire Marshal. In this State the recorded destruction by fire for the year was $4,364,195, of which $1,001,455 was caused by fires of unknown origin.*

# –Impossible When "Aero" is Installed

AERO AUTOMATIC FIRE ALARM SYSTEM discovers a fire in its incipiency and promptly sends out the alarm. Gives warning before the fire gets beyond control; summons help, when help is most needed, in the first stages of a fire—when it can be extinguished before serious damage has been done.

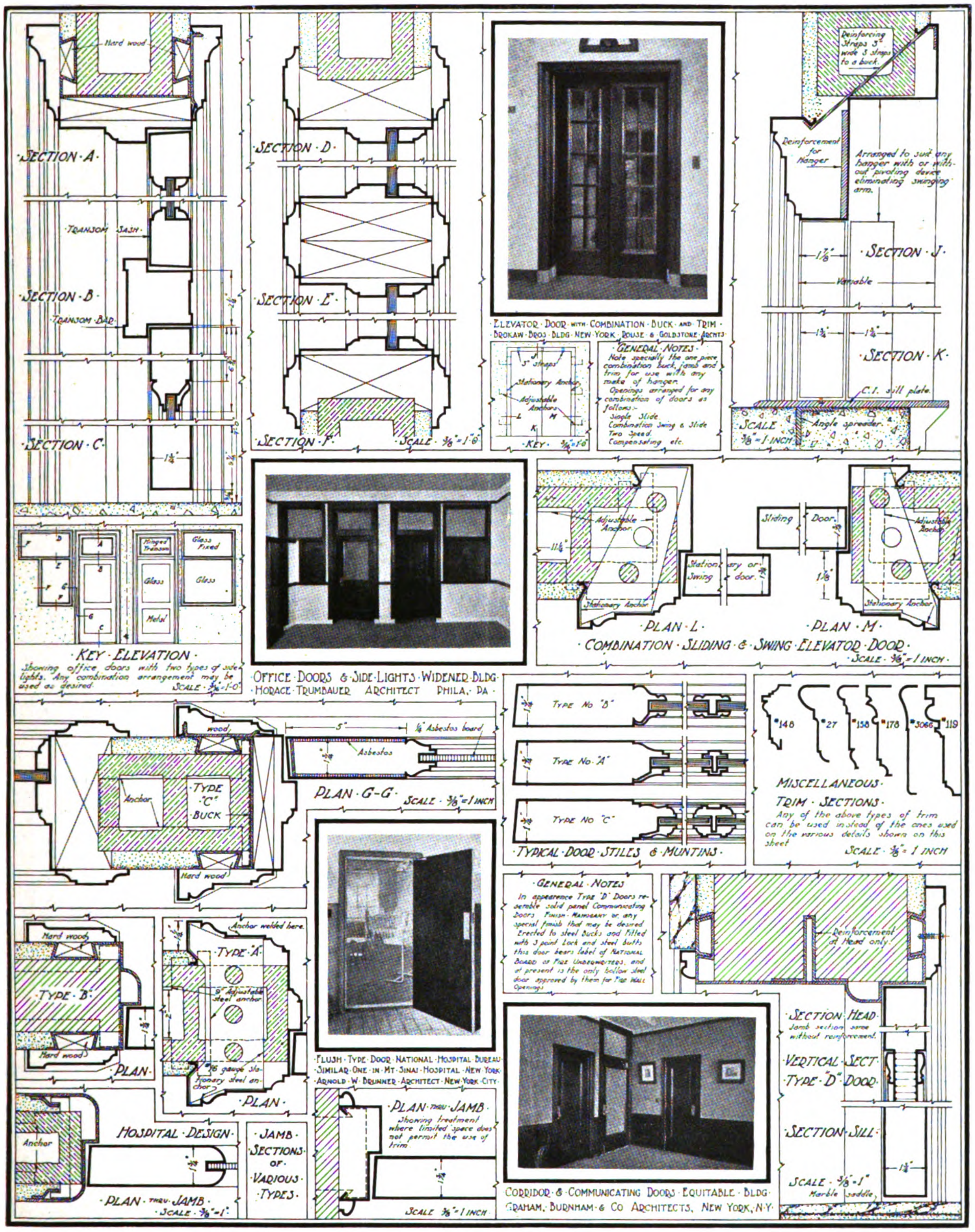
*Investigate "Aero" Fire Protection. It is the most efficient least costly method you can install.*

**AERO FIRE ALARM COMPANY**

**Havemeyer Building, 26 Cortlandt Street, New York**

# FIRE SAFE DOOR WAYS

## *STEEL DOORS, BUCKS and TRIM*



·ELEVATOR·DOOR·WITH·COMBINATION·BUCK·AND·TRIM·
·BROKAW·BROS·BLDG·NEW·YORK·ROUSE·&·GOLDSTONE·ARCHTS·

·GENERAL·NOTES·
Note specially the one piece combination buck, jamb and trim for use with any make of hanger.
Openings arranged for any combination of doors as follows:-
Single Slide
Combination Swing & Slide
Two Speed
Compensating etc.

·KEY·ELEVATION·
Showing office doors with two types of side lights. Any combination arrangement may be used as desired. SCALE ⅛"=1'-0"

·OFFICE·DOORS & SIDE·LIGHTS·WIDENER·BLDG·
·HORACE·TRUMBAUER ARCHITECT PHILA,·PA·

MISCELLANEOUS·TRIM·SECTIONS·
Any of the above types of trim can be used instead of the ones used on the various details shown on this sheet. SCALE·⅜"=1 INCH

·GENERAL·NOTES
In appearence Type "D" Doors resemble solid panel Communicating Doors. Finish - Mahogany or any special finish that may be desired. Erected to steel Bucks and Fitted with 3 point Lock and steel butts this door bears label of National Board of Fire Underwriters, and at present is the only hollow steel door approved by them for Fire Wall Openings

FLUSH·TYPE·DOOR·NATIONAL·HOSPITAL·BUREAU·
·SIMILAR·ONE·IN·MT·SINAI·HOSPITAL·NEW YORK·
·ARNOLD·W·BRUNNER·ARCHITECT·NEW YORK·CITY·

CORRIDOR·&·COMMUNICATING DOORS·EQUITABLE·BLDG·
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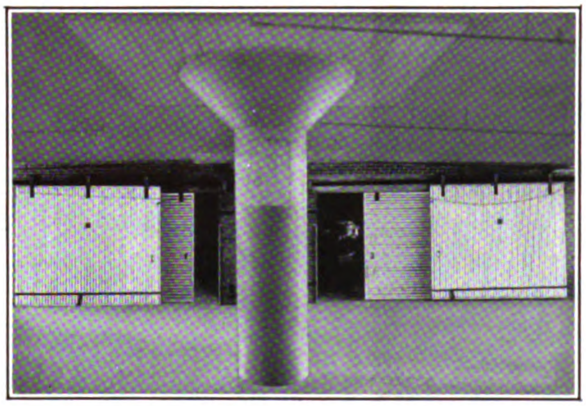

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Of rigid, all-steel and asbestos construction. Light in weight, durable, cost nothing to maintain and secure the lowest insurance rates.

Standard equipment wherever safety is the first consideration.

***Approved***

By the Underwriters Laboratories, Chicago, Factory Mutual Laboratories, Boston, and state and municipal authorities throughout the country.

***Manufacturers of***

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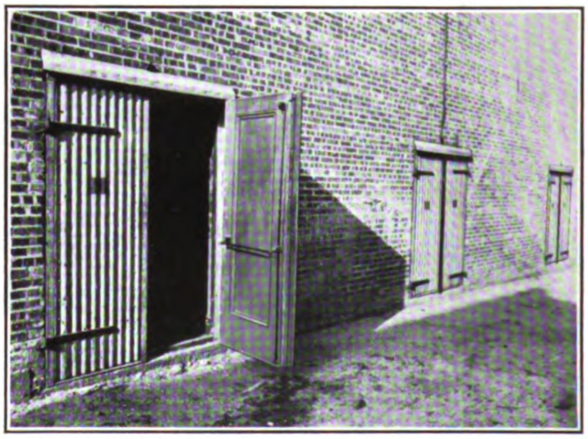
Fire Retarding "Star" Ventilators
Merchant's Metal "Gothic" Shingles
Merchant's Metal "Spanish" Tiles



Installation showing addition of Metal Trim for Interior Finish

---

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| *CLEVELAND* | | *KANSAS CITY* |

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18 EAST 41st STREET
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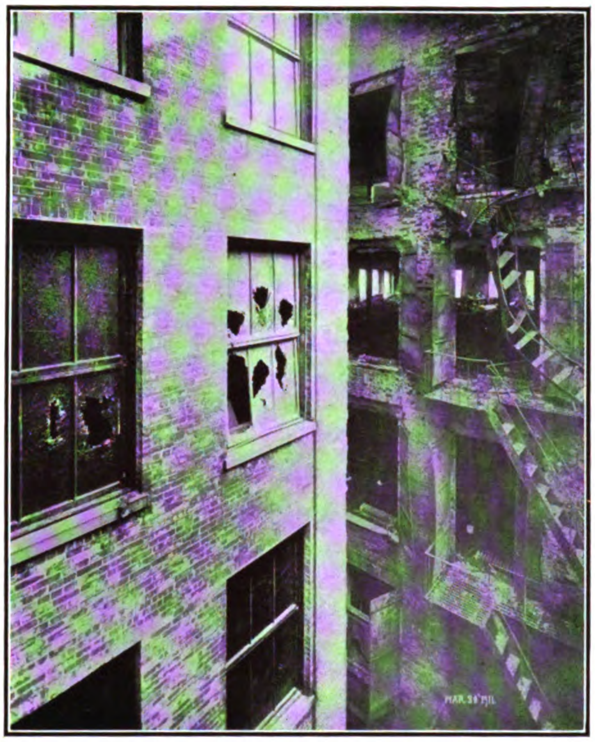

Note the holes punched in the "Wire Glass" windows by the firemen to enable them to fight the fire in the Asch Building from the interior of the adjacent fireproof building, the "Wire Glass" windows acting as a fire shield.

THIS age of Fireproof Construction compels us to be familiar with materials which are approved Fire Retardants.

Of most importance is the question of properly protecting window openings. Wooden frames and window glass or plate glass have proven a failure. What else is there to do?

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# ANNOUNCEMENT

## Of *Especial Importance* to Architects

### Those interested in Fireproof Construction

*THE* architects and others engaged in fireproof construction throughout America will be interested in learning that on the fourteenth day of February, 1917, in the city of Chicago, there assembled in convention representatives of the leading manufacturers of hollow metal windows of the United States; also the result of the convention which in brief is as follows:

### Organization and Name

On the above date there was formed THE NATIONAL ASSOCIATION OF MANUFACTURERS OF APPROVED HOLLOW METAL WINDOW FRAMES AND SASH, with the principal office at 930 West 19th Place, Chicago, Ill. Officers were elected as follows:

FRED DE CONINGH, of The Sykes Co., Chicago, Ill., *President and Treasurer*
J. C. McFARLAND, of McFarland Hyde Co., Chicago, Ill., *Vice-President*
THOMAS F. SHEEAN, of Knisley Bros., Chicago, Ill., *Secretary*

### Object of Association

The purpose of the Association is the promotion of the hollow metal window industry and the enlarging of its scope that UNDERWRITERS' LABELED WINDOWS WITH WIRE GLASS may be obtainable for all classes of openings in buildings, that is, for mild, medium and severe exposures, etc., also for the purpose of disseminating such information as may be of service to architects, owners and builders.

### A Campaign of Co-operation and Enlightenment

The publicity committee is formulating a plan of campaign, in co-operation with a prominent insurance engineer, to enlighten the public on the value of Underwriters' labeled constructions and in keeping them at all times posted as to the progress made by the Association.

Any member of the Association, in whatever part of the country, will be able to supply information first-hand. Upon request he will personally visit the architects, owners or builders and indicate to them how they may construct their buildings, so far as concerns windows, enabling them to obtain the lowest insurance rate accompanied by the greatest fire retardant efficiency. The members, at all times, will be kept fully posted on the most recent rulings and decisions of the Underwriters' Laboratories affecting hollow metal windows and also upon the improvements that are from time to time, made in such constructions in different parts of the country.

### Committees

*Construction:* Fred de Coningh, of The Sykes Co.; J. C. McFarland, of McFarland Hyde Co., and Frank Voightman, of Voightman & Co.—Chicago; John Bogenberger, of Consolidated Sheet Metal Works of Milwaukee, Wis.

*Publicity:* John J. Grace, of Herrmann & Grace Co., Brooklyn, N. Y.; M. F. Westergren, New York, N. Y.; E. R. Leonard, of Leonard Sheet Metal Works, Hoboken, N. J.

### Charter Members

| Firm | Location | Representative |
|---|---|---|
| BIERSACH & NEIDERMEYER | Milwaukee, Wis. | Mr. Hoffman |
| CONSOLIDATED SHEET METAL WORKS | Milwaukee, Wis. | Mr. Bogenberger |
| HERRMANN & GRACE CO. | Brooklyn, N. Y. | Mr. Grace |
| KNISLEY BROS. | Chicago, Ill. | Mr. Sheean |
| HARRY C. KNISLEY CO. | Chicago, Ill. | Mr. Knisley |
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| JAMES A. MILLER & BRO. | Chicago, Ill. | Mr. Miller |
| PERKINSON & BROWN | Chicago, Ill. | Mr. Perkinson |
| POWERS & BOYD ROOFING AND CORNICE CO. | St. Louis, Mo. | Mr. Powers |
| RASNER & DINGER CO. | Pittsburgh, Pa. | Mr. Thompson |
| REISTER & THESMACHER | Cleveland, Ohio | Mr. Thesmacher |
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| F. O. SCHOEDINGER CO. | Columbus, Ohio | Mr. Armstrong |
| THE SYKES COMPANY | Chicago, Ill. | Mr. Fred de Coningh |
| C. E. TRULOCK | New York, N. Y. | Mr. C. E. Trulock |
| E. VAN NORDEN CO. | Boston, Mass. | Mr. Keifer |
| VOIGHTMAN & CO. | Chicago, Ill. | Mr. Voightman |
| T. P. WALSH | San Antonio, Tex. | Mr. Walsh |
| HENRY WEISS CO. | Atchison, Kan. | Mr. Motts |
| M. F. WESTERGREN, INC. | New York, N. Y. | Mr. Westergren |
| WILLIS MFG. CO. | Galesburg, Ill. | Mr. Willis |

*Notes:* Applications for membership from other firms should be addressed to Fred de Coningh, Pres., 930 W. 19th Place, Chicago, Ill.

Information concerning the Association may be had on application to the officers or the undersigned.

Further information of importance will be furnished to the readers of this publication from time to time.

*Signed,*

John J. Grace,
673 Bergen St., Brooklyn, N. Y.

M. F. Westergren,
213 E. 144th St., N. Y. City

E. R. Leonard,
1270 Broadway, N. Y. City

C. E. Trulock, 280 Madison Ave., N. Y. City

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¶ As associate members of the National Fire Protection Association, we try to "do our bit," in saving the people of this country some of the quarter billion annual fire loss.

¶ If the rest of every structure were as safe against fire as the brick walls, there would be no quarter billion annual fire loss.

¶ We offer prompt, efficient, and responsible service in every variety of Face Brick at all of our Branch Offices: Baltimore; Chicago; Cleveland; Davenport; DuBois, Pa.; Indianapolis; Kansas City; Minneapolis; New York City; Omaha; Philadelphia; Roseville, Ohio; Toledo; Washington, D. C. Send for the Hy-tex-Brick Catalogue.

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Saint Louis

**Largest Makers of Face Brick in the world.**

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# ARE THEY GOING TO *YOUR* OFFICE?

And if they are, what of those valuable records? Are they SAFE-CABINET protected against fire and water? Or will the result of many years of labor be wiped out in a few moments?

Grim experience and scientific tests prove that THE SAFE-CABINET can be depended upon—that its contents will be delivered to you unharmed though all else be wreck and ruin.

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**S-CIENTEST**
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**SAFE-CABINET**
**COMPANY**

**25 GREEN ST.**
**MARIETTA, OHIO**

Originators and Sole Manufacturers of THE SAFE-CABINET.

**THE SAFE-CABINET CO.**
**25 Green St., Marietta, Ohio.**

**Send "Written in Letters of Fire" and names of SAFE-CABINET users in business like ours.**

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BACK of every hollow tile made by the National Fire Proofing Company is a corps of graduate ceramic and architectural engineers.

Their combined efforts not only made possible the supremacy of Natco products but also afforded the opportunity of establishing a permanent and ever ready

# NATCO SERVICE

This Natco service is *your* service and is maintained for the sole purpose of co-operating with those desiring assistance in solving their fire proofing problems.

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*23 Factories in the United States*

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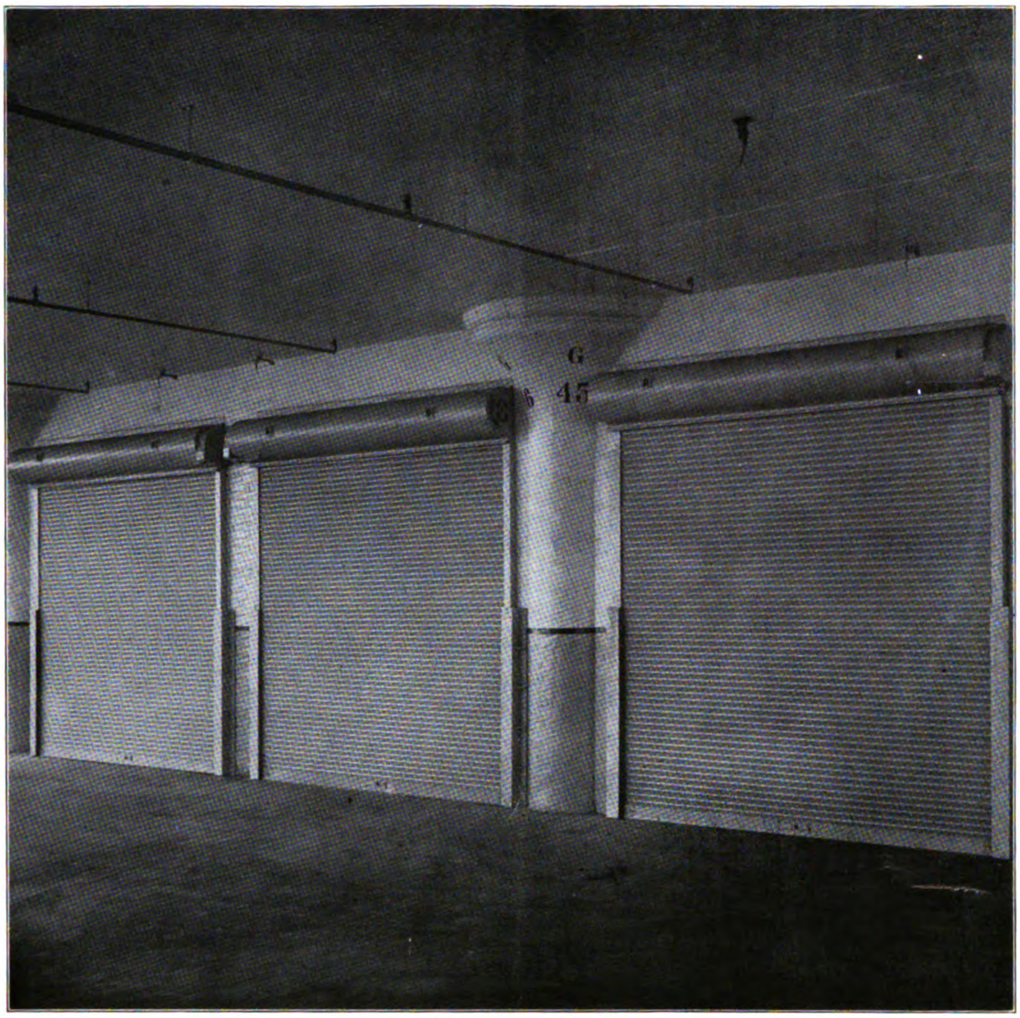
Office at Toronto and Factory at Hamilton, Ontario, Canada.



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# TYPICAL INSTALLATION
OF
# Kinnear Steel Rolling Doors
## ON ELEVATOR SHAFT OPENINGS

## *KINNEAR PRODUCTS*

**have been refined to meet the most exacting architectural requirements and are available for any type of construction or for practically any kind of opening.**

**If you are seeking an effective fire stop which combines economy of space, ease of operation and low cost of maintenance, write us for detailed information.**

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*BRICK and TILE*

MADE RIGHT
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The building laws of many states recognize plaster over metal lath as suitable construction for fire resisting stair soffits and walls in factories, stores, etc.

**Kno-Burn**
TRADE MARK
**Expanded Metal Lath**

is the *standard* lath for all types of construction. Its fine mesh cuts down the amount of plaster. Its smooth surface is easy and quick to plaster over. Its mesh keys the plaster firmly and permanently to it.

Let us send you complete data on our full line. Ask for Booklet 583.

**North Western Expanded Metal Co.**
***Manufacturers of all types of Expanded Metal***
**958 Old Colony Bldg., Chicago, Ill.**

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**THE LAKEWOOD MASON SUPPLY CO.**

DEALERS IN

**BUILDERS SUPPLIES and IRON SPECIALTIES**

Alpha Portland Cement, Bulk Lime, Hydrate Lime, Plaster, Sewer Pipe, Flue Lining, Const. Tile, Drain Tile, Brick, Fire Brick, Fire Clay, Crushed Stone, Sand, Slag, Mortar Colors, Waterproofing, Floor Tile, Angle Iron, Dampers, Ash Dumps.

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**FIRE** APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS TRADE MARK H.M.R. ESTABLISHED 1868 **SAFE**

**SHINGLES**

TESTED by the Underwriters laboratories under their standard tests, Reynolds Shingles have proven themselves worthy of classification as fire preventatives.

Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.

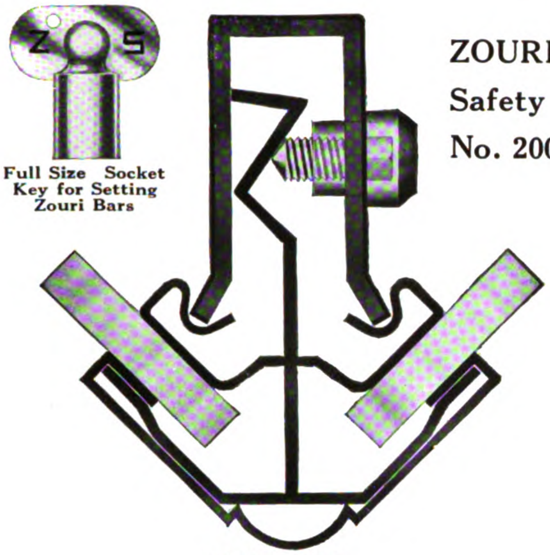
If your dealer cannot supply you write the factory.

UNDERWRITERS LABORATORIES IN [illegible]
ROOFING MATERIAL
CLASS C
ISSUE No. 118

**H. M. Reynolds Asphalt Shingle Co.**
**"Originators of the Asphalt Shingle"**
**Grand Rapids MICHIGAN**

# ZOURI

## Safety Store Front Construction



Full Size Socket Key for Setting Zouri Bars

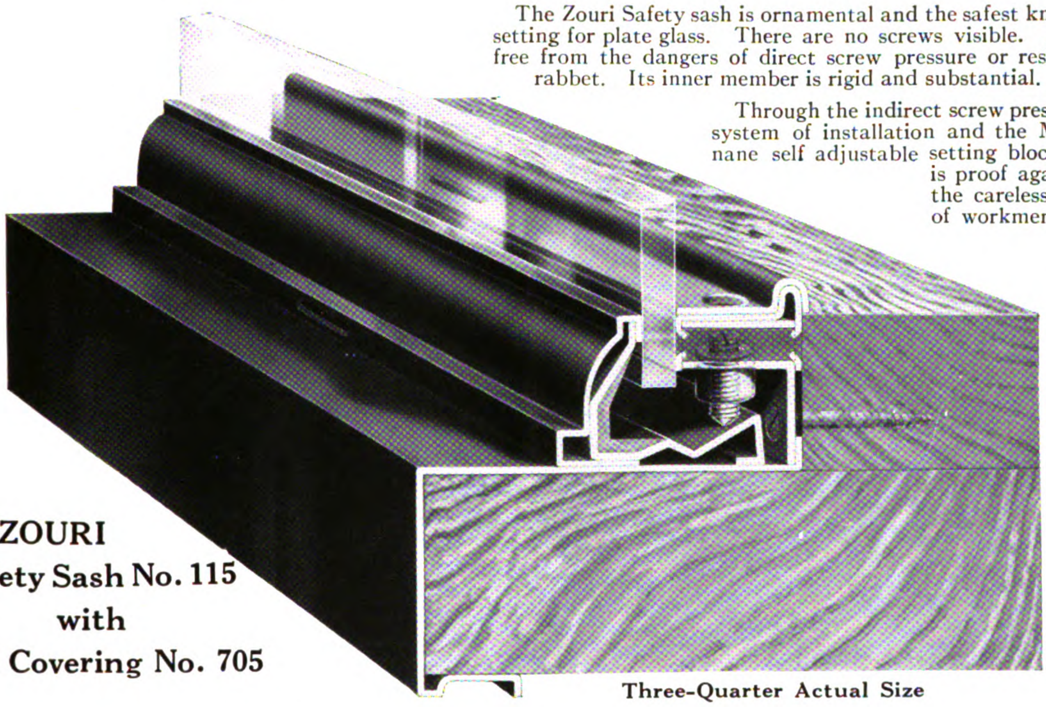
FULL SIZE

### ZOURI
### Safety Key-Set Corner Bar
### No. 200

Zouri Safety Key-set Corner and Division Bars are free from direct screw pressure. They are proof against the carelessness of workmen. They can be set only with the small special socket key shown, so that undue pressure cannot be exerted by the tools used in the building line, the power of which is beyond control. These bars are specially constructed so that the edges of the glass **cannot** come in contact with the metal.

The Zouri Safety sash is ornamental and the safest known setting for plate glass. There are no screws visible. It is free from the dangers of direct screw pressure or resilent rabbet. Its inner member is rigid and substantial.

Through the indirect screw pressure system of installation and the Murnane self adjustable setting block, it is proof against the carelessness of workmen.



**ZOURI**
**Safety Sash No. 115**
**with**
**Sill Covering No. 705**

Three-Quarter Actual Size

*DETAILS MAILED ON APPLICATION*

# Zouri Drawn Metals Company

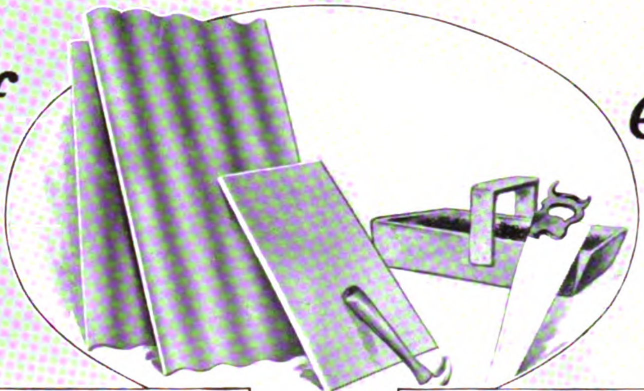
1813-1833 East End Avenue Chicago Heights, Illinois

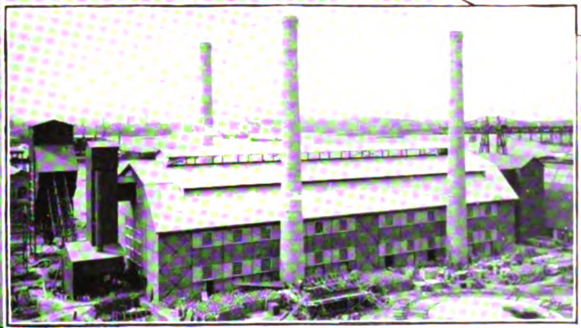
Operating under Murnane and Marr Patents

AGENTS IN THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

# Asbestos *plus* Concrete

*—the fireproof* *—the everlasting*





IT'S a "plus" proposition all through. The combination of concrete thickly reinforced with long, strong asbestos fibres, and made into corrugated Ambler Asbestos Roofing-and-Siding makes a form of sheathing which is Strong; Permanent; Indestructible; Fireproof; Non-Rusting. A material which continually improves under service, and *does not* deteriorate under atmospheric conditions.

## Ambler Asbestos Corrugated Roofing and Siding

***Nothing to Burn***

Ambler Asbestos Corrugated Roofing-and-Siding requires practically no upkeep expense, painting or replacement of sheets; they retain their original appearance and efficiency indefinitely.

"The corrugated asbestos you furnished has outworn three corrugated iron roofs and is in good condition now," writes one big user.

Our corrugated Roofing-and-Siding is only one of the many Ambler Asbestos Building Products which we manufacture. For roofs we also make Ambler Asbestos Shingles, of the same Asbestos-Concrete composition.

There are One Hundred Thousand buildings "covered for keeps" with Ambler Asbestos Building Materials.

*Tell us where to send samples and printed matter on Ambler Asbestos Products.*

**KEASBEY & MATTISON COMPANY**

**Dept. B-3** **Ambler, Pa., U. S. A.**

**Manufacturers of Asbestos Shingles, Building Lumber, Corrugated Sheathing, Pipe and Boiler Coverings**

CONSTRUCTION
ADVOCATING THE CONSISTENT USE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. IV APRIL, 1917 No. 4

## Plans $22.000,00 of New Construction

NOT the least interesting feature of the newly issued report of the American Telephone and Telegraph Company is its reference to the building operations of the corporation during the past year, and the plans determined upon for further work. In part, the report says:

"In co-operation with the Insurance Department of the company, attention has been given to the matter of improving the fire protection for our central offices and the methods whereby the most favorable insurance rates may be obtained. Acting in cooperation with our engineers, the Insurance Department has made during the year (1916) 400 important inspections of telephone central offices, which resulted in many suggestions helpful to the associated companies.

"In new central office building construction the year has been unusually active, general building and equipment plans for 24 new buildings have been worked out by the Department in co-operation with the associated companies. When completed and filled with the equipment contemplated, the expenditures, based upon these plans, would be something over $22,000,000."

The splendid example of the American Telephone and Telegraph Company in the matter of adopting the best modern methods of fire safe construction is one which should be of interest and encouragement to the various units of the commercial activities of America. Buildings constitute the most important economic factor of industry and represent natural wealth, the destruction of which seriously disturbs the economic balance. Fire is known as the great destroyer, and fire losses, being of both a direct and an indirect nature, are at least only partly reparable. Strong in its simplicity is the argument for fire-safe construction, and the success of this great corporation, numbering among its buildings the best types of fire-safe structures known, in the reduction of its fire losses, hazards and insurance premises, affords ample proof of the value of building for permanence and indestructibility. Fire safe construction pays.

## N. F. P. A.

FOR more than one-fifth of a century the National Fire Protection Association has carried on its splendid work of encouragement, investigation and direction in matters of fire prevention and protection. Due to these efforts thousands of lives and millions of dollars have been saved to the American public through the avoidance of fatal and destructive fires; a vast contribution has been made to the economic wealth of the country by conserving that which would have otherwise been destroyed, and intelligent interest in the subject of the reduction of the national fire waste has been awakened in a manner which is causing the safer and wiser placement of the immense sum of money which is annually invested in buildings for the housing of the industries and interests of America.

Incontrovertible is the statement that we *have* invested most unwisely in the creation of a large percentage of our natural wealth which is in the form of buildings. We have built unthinkingly and without proper regulation of construction methods and materials; we have created extensive communities which have been swept by terrible conflagrations; other communities exist in many parts of the country in which the potential conflagration hazard is high. Slowly but surely we are learning the terrible lesson which has been burnt in at Chicago, San Francisco, Salem, Bangor, Paris, Nashville and many other conflagration-swept cities. Slowly, too, but just as surely, are we coming to realize that Boston, New York and hundreds of other cities of America must one day add each a black page to the unwritten history of the shame of America—economic waste—unless quick and wise action is taken in the matter of reducing existing hazards and preventing additions to them. We are realizing, as 8,300 of our homes are destroyed annually, that our homes are not properly constructed;

as our children are sacrificed in school fires, we come finally to the conclusion that schools are not built as they should and could be built; and so, through the various classes and types of building construction, improved practice may be noted.

In all fairness we must also realize that back of a great proportion of this improvement has been the National Fire Protection Association, warning, exhorting, driving home to the minds of the people the lesson of burned cities and preaching against national carelessness and indifference.

At this time, before the twenty-first annual meeting of the Association, CONSTRVCTION wishes to express to the executives and members of the N. F. P. A. the appreciation and gratitude of the building public which it represents and to assure to them that co-operation which the splendid work of this organization deserves.

## Need for Uniformity in Code Requirements

SPEAKING to the writer a day or two ago the head of one of the large construction companies of New York City told of the serious trouble and delay to which members of his engineering staff had been subjected recently in seeking to conform to the building regulations of three different cities, all important and situated in nearby States.

The buildings arranged for were of the same general type, intended for like purposes and under the one ownership. To the lay mind it would appear that one general set of plans—modified, of course, by the size of the ground plots and their respective surroundings—should suffice for all three intended structures. But not so; for, to quote the contractor, "in all three centers the regulations governing construction differed widely. What was demanded at one city was absolutely prohibited in the other two; the latter, in turn, having other ordinances which must be complied with. Nor were the differences of minor importance; instead, they very materially affected the building program." The result worked expense to the owner, and trouble and delay to the contractor.

Why wide variance of basic building requirements should obtain in cities of the first-class is difficult to understand, for it goes without saying that an ordinance approved by expert authority for Cleveland, Ohio, for example, such be equally desirable for Philadelphia, and, per contra, a prohibition enforced in the latter city should not be favored in the former.

Property owners and construction engineers having work in different centers throughout the country find these code contradictions and special regulations a serious hindrance, and inveigh bitterly against them.

The need for standardizing building codes in their elementary requirements is apparent, and municipal authorities, architects, engineers, building material manufacturers and supply men, as well as property owners, should cordially and intelligently co-operate to bring about such result.

## Lumbermen Fearful

UNDER the rough draft of proposed changes in the Saginaw, Mich., Building Code, the fire limits of the city are considerably extended beyond their present borders, and within the greater district it is decreed that all new buildings erected shall be of fireproof or semi-fireproof construction.

The revision further prohibits absolutely the use of wood shingle roofs within the fire zone; and without the limits where houses are 15 feet apart.

As can well be imagined the lumbermen are alarmed over the new order of things, and are actively bestirring themselves to fight the proposed safety regulations. Friends of the measure, however, are alive to the situation, and well fortified with statistical and other data, are confident that they will have no great difficulty in persuading the council members as to the entire reasonableness of the suggested changes, the adoption and sensible enforcement of which would greatly enhance the safety from fire of Saginaw.

## Building Progress

IN view of the fact that so many manufacturers, architects, contractors and other members of the building fraternity are apparently taking a pessimistic attitude in the matter of the effect of war conditions and the great war loan on the building industry of the United States, the following carefully considered statement from the Dow Service Building Reports should be perused thoughtfully:

"There was some trepidation regarding the effect the European war would have upon building througout the country in 1914 and 1915, and yet building construction in 1916 totaled $1,125,356,045, as compared with $921,408,111 in 1915, $882,255,562 in 1914 and $973,894,700 in 1913, the year before the war started. These figures were gathered from official sources in 257 cities and show what a mere $500,000,000 credit to the Allies did to bring building prosperity out of a dismal condition of national over-construction. This country now proposes not only to sextuple that credit, but will spend four billion dollars besides in the same channels that helped to make a construction record.

"There is no evidence in the first quarter reports from twenty-five cities in the New England district of reaction in industrial building construction. A large part of it is work covering additions to existing factories. 'National building operations in the first quarter of 1917,' according to official statements obtained by the *Financial Chronicle*, 'furnishes a total of intended outlay for construction work in the United States heavier than for the like period of any year since 1910 and almost equalling that season."

# The National Fire Protection Association and the Building Fraternity

IN view of the fact that the annual meeting of the National Fire Protection Association will be held in Washington, D. C., May 8, 9 and 10, next, the detailed program of this important gathering will undoubtedly be of particular interest to the building fraternity and to those interested in the encouragement and development of firesafe construction, protective equipment and common-sense maintenance of buildings of every nature.

Following is a detailed program of the twenty-first annual meeting:

**Tuesday, May 8, 10 A. M. (At New Willard Hotel)**

Roll Call.

President's Address.

Report of Executive Committee.

Resolutions.

Reports of Secretary-Treasurer and Editor.

Membership Committee Report.

Public Information Committee Report.

State Fire Prevention Association's Committee Report.

Canadian Committee Report.

Five-Minute Reports from Organization Members on Work in Fire Prevention.

Fire and Accident Prevention Day Committee Report.

High Value Districts Committee Report.

Electrical Committee Report.

Marine Fire Hazards Committee Report.

**Afternoon Session, 2 P. M.**

Nomenclature Committee Report.

Field Practice Committee Report.

Private Fire Supplies from Public Mains, Committee Report.

Standard Hose Couplings, Committee Report.

Round Table Discussion (3 P. M. sharp).

Subject—Hazards of Ammunition Manufacture, Storage and Transportation.

Topic a—Safeguarding Ammunition Factories. W. D. Milne, Inspector Underwriters' Bureau of New England, Boston, Mass.

Topic b—State Regulation of Ammunition Storage and Manufacture. Hon. John Price Jackson, Commissioner, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.

Topic c—Transportation of Explosives. Col. B. W. Dunn, Chief Inspector Bureau of Explosives, New York, N. Y.

**Rules for Discussion**

Each topic will be separately discussed after its presentation by the principal speaker. Any member may participate. Remarks must relate to the topic and be confined to a time limit of *five minutes.*

The principal speaker may close the discussion.

**Wednesday, May 9, 10 A. M. (At Bureau of Standards, U. S.)**

Automatic Sprinklers, Committee Report.

Standardization of Pipe and Pipe Fittings, Committee Report.

Tanks, Committee Report.

Fire Pumps, Committee Report.

Standpipe Systems, Committee Report.

Hydrants and Valves, Committee Report.

Openings in Walls and Partitions, Committee Report.

Roof Openings and Cornices, Committee Report.

Safety to Life, Committee Report.

Address, Dr. S. W. Stratton, Director, Bureau of Standards, U. S.

**Afternoon**

Luncheon at Bureau of Standards.

Column tests; fire tests with panel furnace; inspection of laboratories.

**Thursday, May 10, 10 A. M. (At New Willard Hotel)**

Explosives and Combustibles, Committee Report.

Round Table Discussion:

Subject—Safeguarding Life in Theaters.

Topic a—Planning Theaters for Safety. Clarence H. Blackall, Architect, Chairman Fire Prevention Committee, Boston Chamber of Commerce, Boston, Mass.

Topic b—Fire and Police Department Supervision. Major Raymond W. Pullman, Superintendent of Police, Washington, D. C.

Topic c—Responsibilities of the Manager. R. S. Robbins, Manager Keith's Theater, Washington, D. C.

Laws and Ordinances, Committee Report.

Fire-Resistive Construction, Committee Report.

Uses of Wood in Building, Committee Report.

Manufacturing Risks and Special Hazards, Committee Report.

Reports of Delegates to Conventions of Other Bodies.

New Business.

Report of Nominating Committee and Election of Officers.

For the benefit of those of our readers who, while they are undoubtedly familiar with the name and general purpose of this organization, do not realize how directly they may be benefited by membership therein and by the utilization of its data and published information, which have been the result of many years of careful research, the following general description of the organization and its plan and purpose is given:

### Plans and Purposes of Association

The National Fire Protection Association has two functions. One is to make the *standards* under guidance of which the fire waste may be checked; the other is to educate the people in the observance of those standards and point out the grievous economic penalties for ignoring them.

The character of these standards is shown by the list of publications printed herein. The standards are made by the representatives of the members given on page 2. These representatives are expert fire prevention engineers and serve the Association without pay. There is no public effort in the history of the nation to which there has been so freely given over so long a period so much of expert thought and painstaking technical investigation as to the National Fire Protection Association.

The Association meets annually in a three days' convention, at which the reports on the various standards are presented by its committees of experts and discussed by the convention before adoption. The progress of the nation in science, invention and the industrial arts makes constant revision of these standards imperative. The Association was organized in 1895, and hence for over twenty years has been compiling and revising these standards, which are now the recognized national guide and authority and are officially adopted by the National Board of Fire Underwriters and all other organizations interested in fire protection or prevention.

This work of compiling and revising standards covering explosives, gases, oils, electric wiring and all fire appliances must continue indefinitely. It is a work for experts and demands the services of those members having technical education. The proceedings of the annual convention are stenographically reported and issued in printed form so that all members may study the reports and the discussions thereon at their leisure.

In the great work of *public education,* however, all members may and do share. The colossal fire waste is impoverishing the people. They do not realize it. They must, therefore, be taught, in the press, in the schools, and by public speaking; first, that the fire waste adds tremendously to the cost of living, and second, how to stop it.

The Association's literature is prepared with the object of educating the layman in fire prevention. Although based upon expert knowledge, it is put into popular form, so that anyone may educate himself.

The Quarterly Magazine of the Association is unique in its special articles on fire hazards, fire protection and prevention, and the economic effects of the fire waste. Its editorial matter is clearly and forcefully written, and its carefully edited department of fire records is indispensable to those who are studying fire causes and effects in specific properties. In the Quarterly are described the important fires occurring in the United States and Canada, with special reference to their origin, their extent, and the manner of their extinguishment. By a special method of cataloguing, statistical records are so kept as to permit the publication of fire statistics on special classes of property or occupancy, showing how the majority of such fires start and how in the cases given they were extinguished.

Special studies are made of the effect on concrete and other buildings of fire-resistive construction. Unique bulletins are regularly issued covering the hazards of holiday decorations and Independence Day celebrations, and during each year many individual papers and reports on specific topics are sent to members, besides copies of all the Association's standards, as soon as they are completed and published. The office correspondence of the Association is voluminous, as any information in its files accumulated during the twenty years of its life is gladly furnished its members on application.

The office of the Association is the source of, or clearing house for, all that is authoritative on the subjects of the fire waste, protection and prevention.

The Association's membership is composed of architects, builders, merchants, manufacturers, warehousemen, engineers, fire marshals, fire wardens, fire chiefs, electricians, credit men, bankers, insurance agents and inspectors, Boards of Trade, Chambers of Commerce, Public Libraries and many other organizations, individuals, firms and corporations.

No admission fee is charged for membership. The Quarterly Magazine, the published standards, all special bulletins and other valuable engineering and popular literature issued during the year are supplied to members for six dollars ($$6) per year annual dues. There are no other expenses. The membership year begins with the date of the member's election. Any individual, firm, corporation, or society is eligible to membership.

The office of the National Fire Protection Association is at 87 Milk Street, Boston, Mass., and the secretary will promptly send sample publications to anyone wishing to know of the work of the Association or who may desire to co-operate as a member in reducing the deplorable American ash heap.

Those who are interested in the reduction of the national fire waste, in the safeguarding of buildings of every nature, and in the production and selling of materials and devices which enter into firesafe construction are urged to co-operate with the splendid work of the National Fire Protection Association.

# Record of the New York Chapter, N. F. P. A.

THE following is a carefully-compiled history of the New York Chapter of the National Fire Protection Association from the time of its organization, a little over three years ago, until the annual meeting, held April 9, 1917. This history was embodied in the report of the secretary, E. N. Hardy, rendered at the annual meeting.

The splendid activity of the New York Chapter in the cause of fire prevention has been of incalculable value in its encouragement of this propaganda and of those who have been and are most interested in the work.

It would seem that the following record should serve as an excellent and encouraging guide to the formation of similar chapters in the various centers of building activity throughout our country; and to stimulate and revive those chapters now existing in name only (and in a state of more or less innocuous desuetude) to active efforts which may serve to create greater interest in this splendid movement in each logical locality, an interest which must of necessity prove of value and assistance to the parent association in the forwardance of its national efforts toward sane conservation and the protection of natural wealth.

Following this record will be found the names of the officers and committee members of the New York Chapter who have directed the activities of the chapter through such successful channels; also the names of those to whom, by their election at the last annual meeting, has been delegated the responsibility of carrying on this excellent work.

### The Splendid Three-Year Record

The call for the first meeting was dated November 28, 1913, and the meeting for organization was held at the Engineering Building, New York City, December 12, 1913.

After the meeting in December the next meeting was held November 25, 1914, when the articles of the Constitution, with the usual by-laws, etc., were adopted.

The first annual meeting was April 6, 1914, the speaker being J. O. Hammitt, chief of the Fire Prevention Bureau of New York City, who spoke on the "Attitude of the Municipality in Fire Prevention Work." This was followed by an address by Rudolph P. Miller, president of the local chapter, showing the work done by the Building Department of the city in testing fireproof materials. This latter address was illustrated by stereopticon slides.

June 8, 1914, the second stated meeting—as the Minutes put it, because it was the second meeting after the formal organization—was held at the City Club, and let it be set forth that the rare courtesy of the City Club in permitting us from that time to this to hold our meetings here has contributed in no small degree to the success of the work in which the chapter has been engaged.

The formal charter of our liberties, so to speak, is dated June 15, 1914, being signed by F. J. T. Stewart, as chairman of the Executive Committee, and by Franklin H. Wentworth, as secretary.

On October 12, 1914, the meetings were resumed after the summer vacation. The speaker on this occasion was Ira G. Hoagland, secretary, National Automatic Sprinkler Association, the subject being "Some Things About the Salem Fire." The address was illustrated with stereopticon slides, and a spirited discussion took place at its conclusion.

On December 14, 1914, I think as large a meeting in point of numbers as the chapter has held took place. The subject was the "Fire Alarm Telegraph System of New York City," the speakers being Robert Adamson, Fire Commissioner of New York City, and Putnam S. Bates, chief of the Bureau of the Fire Alarm Telegraph in New York City. Mr. Bates' remarks were illustrated by lantern slides.

The next meeting was February 8, 1915, the subject being "The Edison Fire." Egbert J. Moore, secretary for the Special Committee on the Edison Fire of the American Concrete Institute, opened the consideration of the subject, illustrating his talk with lantern slides. Many of the members took part.

The second annual meeting was held on April 12, 1915, and in addition to the usual proceedings of an annual meeting there was an address on the subject of "The Life Hazards in Factories," illustrated with slides. The speaker was H. J. Goas, a member of the Labor Department of the State of New Jersey.

### Exhibition of Safety Devices

The final meeting for the season of 1914-1915 was held on June 14. The subject considered was "The Danger from the Explosions of Gasoline, Benzine and Other Volatile Oils," the subject being opened by William H. McNutt. In connection with the subject there was an exhibition of the various safety devices for the handling of these kinds of oil. The subject of this meeting, and the fact that it was necessary to have a pint of gasoline to be used for demonstrating purposes, made it necessary for us to secure a permit from the City of New York for the use of this large amount of a dangerous fluid.

On October 18, 1915, the meetings were resumed, the season opening with an address by H. F. J. Porter, M. E., on "The Importance of Building Exits." Mr.

Porter's belief and advocacy of the horizontal exit is well known, and he presented the subject in his enthusiastic, lucid and skillful manner, illustrating it with lantern slides and drawings.

November 6, 1915, there occurred at 285-287 North Sixth street, Brooklyn, a fire which is known and will be known in history as "The Diamond Candy Company Fire." The loss of some twelve lives in this fire under circumstances which indicated a clear neglect, if not positive violation of mere ordinary standards of prudence, so disturbed the community that investigations were started from many points. This fire explains, therefore, why, at the meeting of December 18, 1915, a special committee was appointed to report on this fire. This committee consisted of Howard Chapman (chairman), Ira H. Woolson, W. G. Sewall, William Guerin and Mason R. Strong. The president of the chapter, Rudolph P. Miller, and the secretary, being members ex-officio of this committee. The committee held many meetings, and in due course presented its report, which was first published in the N. F. P. A. Quarterly for January, 1916. It was afterwards reprinted in pamphlet form and had a wide distribution. The statement is ventured that if the chapter had done nothing more than this piece of work it would have justified its existence. The conclusion of the report, which summed up and epitomized the whole thing, ought to be placed in this report. It read as follows:

### Conclusion

The several orders which were not complied with, though issued months previous to the fire, were in our opinion sufficient to have amply protected the lives of the occupants, had they been obeyed. The responsibility for lack of compliance appears to rest both on the owners and tenants who ignored them, and the authorities who issued the orders and failed to enforce them."

The meeting of December 18, however, had the stated address and the speaker was William Guerin, counselor-at-law, the subject being the "Work of the Fire Prevention Expert and its Value to the Municipality."

February 14, 1916, the third meeting of this season was held. At this meeting the special report of the Committee on the Diamond Candy Factory Fire was presented. Copies were distributed to the members. This whole meeting was devoted to the subject of this fire.

The annual meeting was held April 10, 1916, and in addition to the usual routine matters the special topic of the evening was "The New Building Code," the subject being presented by Rudolph P. Miller, engineer to the City Committee of the Code.

The final meeting for 1916 was held on June 12, and the subject for consideration was "Wired Glass." While the paper was read by the secretary, it had been prepared by other parties and was rather a joint contribution to the subject. There was an interesting discussion at the close of the paper.

October 9, 1916, the first meeting of the season was held. This meeting was distinguished by a report from the Committee on Legislation, Howard Chapman, chairman. This committee undertakes and does follow legislative matters that may seem of interest to the special work in which we are engaged, and it is a committee which certainly has done and is doing most commendable work. The day on which our meeting was held (October 9) was Fire Prevention Day, and that special subject was considered as a part of the proceedings, J. O. Hammitt, chief of the Fire Prevention Bureau, setting forth the work of New York city in connection with Fire Prevention Day. Chief Hammitt stated that their emphasis was placed on the cleaning up of rubbish.

The subject of "Explosives," something that was quite prominent in the public mind owing to the Black Tom explosion, was then taken up for consideration, the discussion, as we prefer to call it, although it was a very full presentation of the subject, being opened by Col. B. W. Dunn, who is in charge of the transportation of explosives for the railway company. It is perhaps needless to add that the consideration of the subject after the formal address was concluded was sufficiently keen to keep the chapter in session until quite a late hour.

December 11 brought the next meeting night, and the topic of the evening was "The Fire Menace of Railroads in the United States." The paper was prepared by Alexander Brociner, consulting engineer. It was also voted at this meeting that the chapter plan to have its next meeting not at the stated time, but in conjunction with the National Complete Building Exposition in March. It was so voted.

The week of March 6, 1917, the chapter devoted to co-operating with the National Complete Building Exposition by enlisting the services of different speakers who discussed certain phases of "Fire Prevention" on each of the evenings. The whole affair was carried through in a commendable spirit, and the thanks of the chapter are due to each member who contributed both by his presence and words to make this week a success.

### Adopt Patriotic Resolutions

It was at this meeting that the following action was taken:

"At a stated meeting of the Local Chapter of the National Fire Protection Association, Grand Central Palace, New York City, March 6, 1917, the following resolutions were adopted:

Whereas, At the present time our Nation is passing through a crisis as great, if not greater, than any which hitherto has tried its strength.

Whereas, It is incumbent upon and the desire of all of us to render in this peculiar time of trial all the service to the Nation of which we are capable, and,

Whereas, Our members, by training and experience, are peculiarly qualified to render service in matters of prevention from various forms of disaster, such as fire, explosion, etc.,

Therefore, Be It Resolved, That we hereby tender to the Nation, to the State, and to the city, our services for such use as may be made of them.

Resolved, That a copy of these resolutions, attested by the secretary and president, be forwarded to the President of the United States, the Governor of the State of New York, and the Mayor of New York city."

The response to these resolutions were as follows:

"Dear Mr. Miller:

The Mayor asks me to thank you most cordially for your letter, offering co-operation on behalf of the National Fire Protection Association in the present crisis. You may be sure that the City Administration will call upon you should the need arise.

Very truly yours,
(Signed) Theodore Rousseau.
Secretary to the Mayor."

"Dear Sir:

I write to acknowledge with thanks, the receipt of your letter of March 7, transmitting resolutions adopted by the National Fire Protection Association offering their services to the State.

Your letter has been referred to the Adjutant General for his information.

Yours very truly,
(Signed) Charles S. Whitman."

"The White House,
Washington, D. C.

The President deeply appreciates your very generous and patriotic proffer of your services, and he wishes in this informal way to express his grateful thanks."

The committee who planned the local chapter wisely provided in the constitution that at the end of a certain period of time (three years) the officers and members of the executive committee should, if they had not done so before, be retired by the constitutional limitation for holding office.

Following are the officers of the local chapter who were retired by the limitation set forth in the constitution and those who were elected to carry on the good work:

Rudolph P. Miller, President (retired).
E. R. Hardy, Secretary (retired).
Howard Chapman, President (elected).
William B. White, Secretary (elected).

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CONTRARY to the general belief, gasolene is not such a prolific cause of fires as some other reputed less dangerous article.

During the past year in Minnesota there were only sixty-seven fires directly traceable to gasolene, and these include two fires from gasolene lamps, five from gasolene torches, twenty-four from gasolene stoves and thirty-six from gasolene explosions, and the total property loss from these causes amounted to $52,254, says Robert W. Hargadine, State Fire Marshal.

Compare with this the number of fires due to defective flues, he says: "This cause resulted in 196 fires and the property loss was $209,197, or about four times as great as the aggregate loss from gasolene fires.

"This is explained by the fact that people are awake to the dangerous possibilities in a can of gasolene, but these same people hardly ever think of their chimney flues.

"Therefore this department urges all people, in the interest of proper fire prevention to watch for possible fire hazards.

## *A Call For Recruits*

**The population of the United States is between 90,000,000 and 100,000,000.**

**To satisfy the standards which have already been achieved in Europe, the fire waste ought to be reduced forthwith to not more than $50,000,000 a year.** ***It is now*** **$231,442.995.**

**The** ***National Fire Protection Association,*** **the organization which has for twenty years been striving to arouse the American people to take their proper place among the civilized nations in the matter of fire prevention, numbers less than 3,000 members. This unit has done and is doing splendid work—for its size; but it urgently needs recruits from the millions who are not indifferent to the impoverishment of their country by the ravages of fire.**

***Join up now, or, if you are already a member, get another recruit.***

**Particulars as to the objects and activities of the Association will be gladly furnished on application to the Executive Office, 87 Milk St., Boston, Mass.**

**Franklin H. Wentworth,** ***Secretary.***

## Bad Housekeeping and Carelessness

THE National Association of the Motion Picture Industry is issuing a fire prevention bulletin. Under the head of "Bad Housekeeping and Carelessness" in motion picture risks it mentions the following factors: Unguarded radiators; unprotected electric light globe over film; wire wrapped around steam pipe; film scrap on floor; lengths of film on floor; willow waste basket used; film on fire extinguisher; too much film on each table; film not kept in cans; smoking; waste paper and newspapers on floors; posters in same room with film; lack of order and cleanliness.

Speaking of "Good Conditions, Handling Just as Much Film," it notes the features subjoined: Automatic sprinkler system; radiator guarded properly; electric lights guarded properly; no wires wrapped on pipe; metal waste cans; no scraps or loose film lengths on floor; small quantity of film on each table; all film in cans except that being worked on; metal furniture used; extinguisher in proper place ready to use; order and cleanliness.

### Fire Preventive Precautions

The following very intelligent recommendations are made as to fire preventive precautions:

1. Keep plenty of water handy: (a) In an automatic sprinkler system suitable to your conditions; (b) in convenient buckets; (c) in faucets with an inch and a quarter hose and nozzle attached. (d) Have fire extinguishers, which everybody is shown how to use. (e) Keep sand pails handy. Sand will stop a small film fire and will not damage the stock.

2. Keep film in containers when not actually in use. The time lost in replacing it is nothing. Naked film is the one condition that guarantees that a little fire will get beyond control in a few seconds.

3. Throw film scraps into self-closing metal cans, never into open waste baskets.

4. Keep the cutting rooms, etc., well swept. The tiny pieces of film that fly about make the dust as dangerous as so much gunpowder.

### Employ Professional Electricians

5. Have a professional electrician do all your wiring, in accordance with every city ordinance, no matter how "unreasonable" it seems. Have the light globes caged; a broken globe may make only one spark, but that can ignite $1,000 worth of film. Handle no film by artificial light but electricity.

6. Box your radiators and steam pipes. The film that touches a hot pipe and crinkles up might just as easily have burst into flame.

7. Enforce the "no smoking" rule. Give the boys a smoking room if they need it, and make the boss and his guests who are looking over the place leave their cigars, cigarettes and pipes outside, as they would if they stepped into a theater for a glimpse of the picture.

8. Banish the "strike anywhere" match. Furnish boxes of safety matches free, if necessary. But don't have anything that will light except when it is intended to.

9. Keep only enough cement, gasoline and collodion on hand for the day's work. They are all highly inflammable and should be stored where they can do no harm.

10. Appoint one man or woman as fire monitor and let him know it is all his job is worth to fail to call down the boss, the cutter or the office boy for any carelessness.

## City Planning at Elgin, Ill.

THROUGH the courtesy of public-spirited individuals and institutions the Elgin (Ill.) Commercial Club was able to undertake recently a comprehensive plan for altering the present plan of the city along lines that would make for greater usefulness, comfort and beauty.

The suggested plan, prepared by E. H. Bennett, a well-known consulting architect, proposes among other sensible measures: Building height restrictions; fire limit laws; creation of residential districts in which only one and two family houses, private garages and private stables are permitted; areas in which multiple family dwellings may be erected; industrial districts, near which proper homes for the employees may be built. It is further recommended that the "time is at hand when a larger and a fireproof City Hall be erected."

The proposed changes are all in the line of desirable improvements, and the members of the Commercial Club responsible for the excellent survey deserve well at the hands of their fellow citizens.

## $200,000 Blaze at Rockaway, L. I.

TWELVE cottages and a Summer hotel at Rockaway Park, L. I., were destroyed by fire a short time ago, the loss thereon being placed at $200,000.

Fanned by a strong wind, flaming embers, to quote from local press accounts, "were carried a long distance from the hotel in which the fire originated, and owners of other buildings were on their roofs with buckets of water and extinguished the embers as they fell on the shingled roofs."

Had the fire occurred in mid-Summer, when the wooden roofs were twisted and scorched by the hot suns, the strong probabilities are that the volunteer firemen would have waged a losing fight, and that the attractive group of cottages at the resort would have been left a shapeless mass of blackened timber, affording mute testimony to the folly of frame home construction.

# *Asbury Park Pays Penalty for Poor Construction*

FOUR solid blocks of buildings at Asbury Park, N. J., were completely destroyed in a sweeping conflagration on April 5. The property loss is placed at from $750,000 to $1,000,000, and it may be found to exceed the latter figure. That the destruction, severe as it was, did not prove far greater, was due mainly to a heavy rain storm that came up in the early stages of the fire, thoroughly saturating the numerous wood shingle roofs in the threatened district, thereby making difficult their ignition from the flaming brands falling upon them in great quantities, and to the vantage ground offered the fire fighters by the brick-walled and slate-roofed Methodist Church, where the flames were finally stayed.

Asbury Park is one of the most famous of the North Jersey shore resorts, and in the season has a population of probably 30,000 persons. Its hotels and residence properties are mainly frame and with the dangerous wood shingle roofs. That a sweeping conflagration has not occurred in the city before is certainly not due to the foresight of its citizens in erecting structures that would even measurably safeguard against such disaster, but rather to rare good fortune.

### Story of the Conflagration

The story of the conflagration as reported in the *Asbury Evening Press* is, in part, as follows:

"Four blocks of Asbury Park hotels, boarding houses and residences, the $125,000 boardwalk, Natatorium, part of the boardwalk and the First Methodist Episcopal church, were destroyed by fire last night. From the boardwalk to Grand avenue and between First and Second avenues the fire made a clean sweep of 48 buildings. It was driven from its starting point in the Natatorium before a 65-mile gale and laid waste $1,000,000 worth of property before desperate firemen concentrated on the church building could do their first effective work. In a comparison of fire losses in the city, last night's fire was a conflagration.

"Panic attended the fire. Hundreds of residents for blocks on all sides of the fire zone packed their belongings and made for the homes of friends out of the path of the onrushing flames. Sparks showered all parts of the city as far north as Eighth avenue, and west almost to the sand hills, and only the thorough soaking of shingle roofs by the rain that attended the gale prevented further damage. Dynamite failed as a means of checking the spread of the fire. Water pressure was all that could be expected from the small mains in this district and hundreds of firemen swarmed throughout the zone, ready for any duty, but pushed back house by house, unable to maintain a footing on the roofs, futile with their hose streams which were whipped into spray, they could offer no resistance.

It was the fire that Asbury Park for years had realized one day would come. It came under conditions often speculated on as to the extent of the damage. In the catalogue of dread of such a fire, the rain last night was the single redeeming feature. Wind velocity started a blaze that seemed to spread like an exploding bomb, and once the fire had crossed Ocean avenue the whole middle section district of frame hotels, boarding houses and residences were endangered.

"The Natatorium seemed afire from wall to wall in an increditably short time. Crossing Ocean avenue, the flames attacked the Murphy & Krug amusement hall, spread to Daly's theatre and the Devonport Inn, and then raced through that building to the Grand Central Hotel adjoining. Step by step the fire worked toward Kingsley street, and though the stucco exterior of the Winthrop offered something of a resistance, there was no time for a flanking movement by the firemen and the flames quickly gained headway.

Seven houses west from the Winthrop, Fire Commissioner Leroy and his chiefs determined to use dynamite on the Ardsley Hotel, in the hope of making a stand there. The big boarding house was only partially wrecked, and it was of no avail. The flash fired the Ardsley.

Flames shot through the Winthrop, attacking buildings west on Second and First avenue. The fire crossed Bergh street and hurdled the block to Heck street, where the Whelan home and Sea Rest offered a frame front the entire width of the fire zone. The Whelan fired and through the four stories the flames leaped on toward Grand avenue.

Meantime the wind veered slightly into the south, and for a time the fire skirted some of the houses fronting First avenue, west of Bergh. Long after the walls of the Methodist church had fallen the Robinson home, at the northeast corner of Heck and First, stood intact, while one by one the cottages intervening from Bergh street caught fire, burned until the skeleton was outlined by the flame in the smoke and then collapsed.

On the First avenue side the fire had wiped out the Surf House at Kingsley street, moved through the store building on the opposite corner into a cottage, the Richards House, the Southern Hotel, Tilton's garage, and again razed the Carolton Hotel, rebuilt last year after a mid-summer destruction the year before.

### Brick Church Affords Vantage Ground

The width of Grand avenue and the brick church offered the firemen their first opportunity for effective resistance. The four stories of the Regina Hotel stood etched in fire for 15 minutes and toppled in a flash.

Would the brick church check it?

Flames suddenly appeared in the roof of the church, then, from a circular window in the south a burst of flame that filled the whole opening shot 25 feet toward the street. The Grand avenue door was opened for an instant and another great cloud of fire rolled out. The tower caught, fire appeared in other sections of the roof; the building was gone.

Altogether the fire wiped out 19 hotels, the Whelen home, 2 stone buildings, 6 garages, 16 cottages, 2 theatres, the Murphy and Krug amusement hall, the church and the Natatorium—48 distinct buildings.

### Gale Was Unrelenting

The gale was unrelenting. Great pieces of blazing woodwork were caught up in the vortex and sent crashing through the sides of frame buildings. Almost solid masses of flaming embers and sparks were hurled against structures adjoining the burning buildings, and these burst into flame. Hotel after hotel on the Second avenue side of the block between Kingsley and Bergh streets was destroyed almost before the firemen could shift their lines.

Just west of the Ardsley was a 50-foot open space, then a small private dwelling crowded against the four-story Holland Hall. It was hoped that with the Ardsley leveled with dynamite the firemen could work east of Holland Hall and prevent further spread of the flames westward.

Hardly had the blast torn out the center of the hotel, however, when the Carlton Hotel, at First avenue and Bergh street, caught fire. In half an hour this big four-story house, rebuilt since the fire that wrecked it two summers ago, was a mass of ruins.

### Rain Was Godsend

Rain which soaked shingle roofs probably saved a greater part of the city from destruction. Sparks and blazing timbers were carried many blocks west of the railroad tracks and south of Second avenue during the early part of the fire, and with a shift in the wind, after the flames had reached the block between Heck street and Grand avenue, sparks fell in showers on structures far up into the northwest section of the city and to North Asbury.

### Progress Checked at Church

The Methodist church, an imposing structure at Grand and First avenues, deemed practically fireproof on the outside, with its stone and brick construction and slate roof, was the last building to go. Woodwork in a peak of the roof ignited from burning stables in the rear of the Second avenue dwellings, and soon the big auditorium was transformed into a furnace.

### Lesson Taken to Heart

That the outstanding lesson of the conflagration was not wholly lost upon the responsible public officials of Asbury Park was sufficiently attested by their prompt adoption of an ordinance "requiring every hotel, boarding house or other public or semi-public building, whether contemplated for the fire code zones or not, to be of fireproof construction."

If the city fathers would still further insure against the fire menace they would prohibit absolutely the use of the wood shingle roof, not only upon public or semi-public buildings, but upon private properties as well, for the wood shingle offers one of favorite means of travel for the fire fiend.

## *Models as Architectural Aids*

A VERY interesting exhibition of Architectural Models is now being held in the Country Life Permanent Exposition in the Grand Central Terminal, New York City. This special exhibition started April 23 and will run for ten days. It is receiving a great deal of publicity and is being well attended by architects, builders and the public in general.

It is surprising to note the growing popularity of the model among architects and builders. Model-making is not a new profession, but until recently models were used mostly to show buildings already constructed. Of late, however, there has been a particularly large demand for models before the erection of buildings. Architects are becoming more and more convinced that they can work out problems and show results to their clients much easier by getting up small models than by making drawings. The client is better able to visualize the completed building through a model than a rendering or water color.

Some very pretty effects have been obtained by clever model-makers of late. Among the models shown at the Country Life Permanent Exposition are those of large estates, containing pergolas, sunken gardens, whole groves of trees and palatial homes. Other models of attractive little bungalows, rustic camps and tea gardens are the subject of special comment. Many of these models are illuminated from within and appeal very strongly to the man who plans to build a home of his own. Particularly good workmanship is shown in the several large hotel models that are on exhibition. Several topographical models have also received a good deal of favorable comment.

## *Adopt Uniform Standards*

AS adopted by the National Association of Mixer Manufacturers, standard sizes provide for side-loading, concrete-mixing machines with capacities of 4, 7, 14, 21 or 28 cubic feet each, and for end-loadings or paving-mixing machines with capacities of 7, 10, 14 or 21 cubic feet each.

*A Department Devoted to the Use of*

**AUTOMATIC SPRINKLERS**

*Edited*

**IRA G. HOAGLAND, Secretary** **PAUL MASON, Special Representative**

*National Automatic Sprinkler Association*

# *Automatic Sprinklers in Munition Plants*

ALTHOUGH there have been expressions by well-informed men of doubt as to the efficacy of automatic sprinklers in munitions plants, the weight of evidence seems clearly to be that they possess a definite and real value in the protection of this class of properties. The greatest powder manufacturer in the country, if not in the world, du Pont de Nemours, has an abiding faith in them; for Fillmore Tyson, former chief of the Louisville (Ky.) Fire Department, and for nearly two years chief of the department of fire control in the City Point (Va.) plant of the du Pont Company, has no less than 108 sprinkler systems, mostly automatic, but some manually controlled, under his supervision. And this is only one of the du Pont plants. At Dayton, Ohio, is a shrapnel plant of considerable magnitude under the protection of a system of 277 heads, and most of the more permanently constructed plants of this character are under sprinkler protection.

### $300,000 Fire at Dayton, Ohio

The Dayton plant was badly damaged by a $300,000 fire last fall, with plans to sprinkler it just completed. The loss, in the opinion of experts, would have been negligible had the sprinkler system been installed. For that reason a summary of the fire story, including structural features, which had an important bearing on the problem of fire control, will be of interest.

There were a number of peculiar features to this fire, which involved a considerable portion of the plant of the Manufacturers' Production Company in November. Loss was approximately $300,000, with insurance to value 90 per cent.

Construction features played an important part in the general result. Two buildings were involved, each covering an unbroken area 60 x 170 feet. The 16-foot space between buildings had been roofed in for storage purposes, thus making them virtually one building, consisting of three unbroken structural tubes 170 feet long. The fire was checked in a third building at the point to which it had extended when the fire department arrived.

The buildings were not sprinklered. When the first building was erected a 4-inch line was run in from the 8-inch street main. Later, as the plant was enlarged, a 6-inch line was added and the 4-inch was tied into it. Seven standpipes with 2-inch hose were cut into the 6-inch at various parts of the buildings. Openings had been left for sprinkler distribution. The blueprints, which were destroyed, called for 277 heads. Chemical extinguishers were distributed in large numbers throughout the plant.

The buildings were one story high, brick walls with metal sash, wooden roof supports and metal roof covering.

As outlined in the foregoing, the buildings had been roofed into one, this work having been completed only a few days before the fire. Polishing and heat-treating departments, in addition to storage, were located in the narrow tube between the large buildings. The fire had its origin in this section and communicated rapidly to both sections.

Short circuit in a pendant cord, used by a polisher to inspect the inner shell with a small lamp, is given as the cause of the fire. It is supposed the insulation had become worn from constant contact with the metal. There is a well-substantiated story that an employee seized a gasolene-soaked rag and tried to extinguish the blaze. Failing in the attempt, and having been severely burned in the effort, he cast it from him ablaze, and it fell in a pan of kerosene. Under every machine was an open pan of oil from which a belt carried the fluid up to lubricate the tool. As there were scores of these machines in each of several rows in each building, conditions were ripe for a flash fire, and both buildings were soon seas of roaring flame.

### Flames Travel Rapidly

One employee told his brother, a member of the fire department, that he saw the fire at the beginning, and that it traveled through the two buildings in less than three minutes. Four of the mill hose lines had been used, but the men were riven from their posts. Prompt arrival of the department saved the third building of the plant, but the firemen could only check the blaze, as it was beyond control in the sections first affected and burned itself out.

The plant having been built hastily in an isolated district, the fire department lacked water distribution and operated to capacity. Twelve engine streams, the lines averaging 1,000 feet, were used, and the mill streams, when recovered, were used to good advantage. In fact, one of them, manned by firemen, helped hold the fire until reinforced. Water pressure was ample, averaging 70 pounds at the hydrant. This was reinforced by engine pressure to a material degree.

### Sprinklers Would Have Held Fire

Chief Frank B. Ramby is strongly of the opinion that, if the sprinkler system had been installed and in operation, the fire would have been checked promptly and the loss held to a minimum; this notwithstanding the flash nature of the blaze. The rapid spread of the fire was largely due to the pans of oil under the lathes. The contents volatilized rapidly and the flame communicated at once from one machine to the next in both of the buildings.

Even if the point be conceded that the sprinklers, if in operation, would not have extinguished the fire in the oil, the chief declares that the cooling effect of the rain from the heads would have been sufficient to have kept down the volatilization, and that lacking the gases thus generated the fire would not have spread as rapidly or to as great degree as it actually did. If the plant had been sprinklered, he told the writer, most of the loss would have been prevented. Then he added: "In the case of volatiles, where it might be beyond reason (although I am not sure of this) to expect actual extinguishment, the operation of sprinklers by cooling the atmosphere and the volatiles themselves prevents the rapid generation of combustible or explosive gases, and so holds the fire in check until the fire department can take measures to meet the peculiar circumstances of the case."

A routine report by the Ohio Inspection Bureau, made a month before the fire, points out that construction was excellent, although spacing of buildings was too close; maintenance was good and housekeeping of high order. It should be emphasized, however, that the buildings affected by this fire contravened the basic construction principle for all buildings involving extraordinary hazard, in that, even as originally built, they were only 16 feet apart, and that this hazard (exposure) was enhanced by roofing them into one structure, thus providing a tube by which possible fire could communicate easily from one building to another, and, as it developed in this instance, furnishing a point for the development of a fire that spread rapidly to both buildings. Concerning this point, W. D. Milne, inspector for the Underwriters' Bureau of New England, in a recent report to the Bureau, said:

"Buildings should be of light construction, only one story in height and well separated, at least 50 feet for ordinary processes and not less than 100 where high explosives are used; and greater distances if these are used in any quantity."

Mr. Milne, elsewhere in the same report, emphasizes the hazard of new construction in the form of additions to existing plants, in the following language:

"The introduction of hazards of construction in the building of extensions to existing structures. This feature assumes a prominent place in a consideration of a sprinklered risk, where the protection of the whole plant may be virtually set at naught by reason of failure to equip new portions promptly."

### Hazards of Munition Plants

The hazards of a munitions plant are the aggregate of the hazards of many industries. The great majority of these plants do not load the shells; many of them make only parts of shells; others are assembling plants; still others carry the product to completion except for the attachment of the fuse, which is done near the rear of the fighting front, the fuses being shipped separately. Bearing these facts in mind, the hazards of manufacture, except where the process of loading involves the handling of explosives, are those of the following industries:

Steel plants—making projectile steel bars.
Brass plants—cartridge cases.
Screw machine shops—fuses, primer cups, etc.
Machine shops—machinery projectile forgings.
Forge shops—forging projectile cases.
Bolt shops—bullets.
Pressed metal works—tincups, powder tubes.
Woodworkers—shipping cases.
Can factories—shipping containers.

If the loading process is carried on in the plant this list should be augmented by the following:

Powder mills—powder and powder pellets, fulminate caps.

These industries all have their more or less peculiar structural features, all of which are modified to a considerable extent by the installation of automatic sprinklers. Mr. Milne emphasizes a number of them; others are so well understood that special mention is hardly necessary.

"The hazards of forge shops have long been recognized," he says, "and rules for their protection are well established. The construction should be of incombustible material throughout, this type of construction being superior for this occupancy to the steel-trussed plank roof type."

Elsewhere it is pointed out that lead baths should be only in non-combustible surroundings; no combustible material or construction should be near oil-fired furnaces or muffles; in the machine shop section construction is necessarily heavy for this class of work. Such buildings are usually of the mill type, fully equipped with sprinklers.

In the machine shop lacquer dry ovens should be of all-metal construction; where there is an elaborate and expensive equipment for supplying power to hydraulic presses, it is desirable to place this in a separate building or fire section, of non-combustible construction.

In buildings occupied by any of the processes enumerated in the foregoing, sprinkler protection is emphasized as the only assured form of protection. It may be assumed with certainty, therefore, that in such an industry as this, combining, as it does, both the common and the special hazards of most or all of them, sprinkler protection of the highest standard type, and maintained with the utmost care to assure its efficiency, even after its fire, exemplifies that fact.

All the kinds of occupancy listed as entering into the munitions industry are not separately classified in the record of sprinkler efficiency. However, grouping steel, brass and bolt shops, pressed metal works and can factories as metal workers, the following record is available:

| Extinguished Fire | | Held Fire in Check | | Total Satisfactory | | Unsatisfactory | | Total No. Fires |
|---|---|---|---|---|---|---|---|---|
| No. | Percent | No. | Percent | No. | Percent | No. | Percent | |
| 416 | 64.7 | 197 | 30.7 | 613 | 95.4 | 30 | 4.6 | 643 |

Others classified in the sprinkler record are:

Machine Shops:

| No. | Percent | No. | Percent | No. | Percent | No. | Percent | Fires |
|---|---|---|---|---|---|---|---|---|
| 169 | 62.4 | 87 | 32.1 | 256 | 94.5 | 15 | 5.5 | 271 |

Forge and Smithy:

| No. | Percent | No. | Percent | No. | Percent | No. | Percent | Fires |
|---|---|---|---|---|---|---|---|---|
| 10 | 76.9 | 3 | 23.1 | 13 | 100.0 | .. | ... | 13 |

Box Factories:

| No. | Percent | No. | Percent | No. | Percent | No. | Percent | Fires |
|---|---|---|---|---|---|---|---|---|
| 87 | 48.3 | 74 | 41.1 | 161 | 89.4 | 19 | 10.6 | 180 |

The sum of all these occupancies co-ordinated in the munitions industry therefore demonstrates a sprinkler efficiency as follows:

Extinguished fires, 682, percentage, 61.6; held fire in check, 361, percentage, 32.6; total satisfactory, 1,043, percentage 94.2; unsatisfactory, 64, percentage, 5.8; total number of fires, 1,107.

It is reasonable to assume, therefore, that with this high percentage of sprinkler efficiency in the industries whose individual hazards make up the sum of hazards in a munitions plant, sprinkler protection is essential to the safety of the munitions plant itself. This point takes on added importance from the fact that these plants are now making munitions for the United States, as well as for its allies.

## *Preparedness Against Fire*

REALIZING the needlessness of the great annual fire waste and the economic drain it imposes upon the people, the Association of Credit Men has pledged its aid to Robert W. Hargadine, fire marshal of Minnesota, in his campaign to arouse the business men of the State as to the need for preparedness against fire.

Marshal Hargadine in a recent statement declared that:

"Neglect and carelessness caused a property loss of $1,152,240 from fires in Minnesota in 1916.

"The commercial interests of the State should wake up to the fact that this is a direct tax on progress. No State can stand a constant loss of more than a million dollars a year and prosper. And the greatest losers by such a loss are the enterprising merchants, manufacturers and businessmen of the State. If this property had not been destroyed by actual carelessness, it is a mere bromide to state that it would be a source of revenue to somebody.

### Better Fire Prevention Methods

"It is to eliminate this useless loss that the State Fire Marshal's Department willingly accepts the offer of the Association of Credit Men to lend their aid in urging the necessity of better fire prevention methods on the merchants.

"The loss referred to is not the aggregate caused by fires in Minnesota in 1916, but it represents the amounts attributed to 'unknown' causes of fires. The known causes resulted in an aggregate of $3,453,880, and knowing the causes it is probably easier to direct attention to them to correct the evil.

"But the unknown cause, like any other problem, is probably the most serious menace; therefore, the solution of fire prevention must be worked out from that angle.

"The unknown cause cannot properly be attributed to incendiarism, because we have reports showing the loss from incendiary fires, which amounts to only $55,266, or about one-tenth of the loss resulting from carelessness or neglect.

"To prevent fire you must be prepared. Equip your property to prevent the spread of fire. Walk through your establishment and look around. Remember, every oily rag, every furnace, flue, coal bin, rubbish box, waste basket, all hold potential destruction.

### Penalty of Defective Flues

"There were 196 fires, with a property loss of over $200,000, during the past year in Minnesota, due alone to defective flues. Fire is a sleeping enemy; at any moment carelessness may arouse it. You fight for your position in the commercial and industrial world, but property destroyed by fire is irrevocably lost. Insurance will repay you for your burned property, but no insurance can recall your scattered employees, your lost business, your customers, orders, rents, tenants, good-will, and more especially no insurance on earth can repay for the loss of life, which may be the result of carelessness or neglect.

"Be as vigilant in regard to the possibility of fire as you are of your business, and within a short time the annual report of the State Fire Marshal will be issued without the dreadful 'unknown' cause, carrying, as it does, more than 25 per cent of all the losses by fire."

The advice given by Mr. Hargadine to the citizens of Minnesota might with equal profit be followed by citizens of all other States.

# War Emergency Fire Prevention

PARTICULARLY timely is the consideration of the subject of fire prevention and protection in its relationship to the peculiar hazards and conditions incident to a state of war and the great National movement of preparedness.

Nowhere, perhaps, can we turn with greater confidence for timely and valuable suggestions than to the war work of the British Fire Prevention Committee, that splendid organization of our allies and blood-brothers. This work during the past year was comprised mainly as follows:

1. The establishment and direction of a technical inquiry office on all matters of fire prevention and protection.
2. The administration of a special fire survey force of members of the technical professions acting in an honorary capacity.
3. The survey of the large number of establishments taken over or formed for war emergency purposes in different parts of the country.

The committee actively co-operated with various Government and public authorities in the technical and administrative matters arising out of the war, and it can be well understood that such co-operation covered a wide range.

### The "Fire Warnings" Service

A particularly valuable service which was rendered to the country during the year was that of the "Fire Warnings," as illustrated on page 179. This comprised the preparation and distribution of about thirty forms as posters, the total of warnings distributed running well over 400,000. Arrangements were made with various organizations, societies and public bodies for the proper display and distribution of these warnings, and through the medium of the press such distribution of facts contained therein brought them to the attention of an immense number of persons. Air raid warnings and suggestions were also distributed widely by this organization.

Among other "warnings" prepared and distributed were those covering the following classes:

Hospitals
Convelescent Homes
Soldiers' Institutes
Refugee Hostels
Red Cross Workrooms
Billets
Hutment Camps
Factories
Munition Works
Churches
Public Buildings
Schools, Colleges, etc.
Theaters, Music Halls
Christmas Entertainments
Farms, Estates, etc.
The Blind

Some of these subjects are of particular interest in the United States at this time and will be considered briefly. For instance the

### Warning for Troops Billeted

Carelessness with matches is particularly advised against, as well as the disposal of cigarette and cigar ashes and ends, and smoking in bed, barn or loft is pointed out as dangerous. Reading in bed by candle light or oil light, candles without candlesticks, poorly placed oil lamps, gas burners near curtains, paper shades touching electric light bulbs, rubbish near fireplace, drying clothes before fire, oil stove and gasoline and oil hazards are warned against in the form of posters similar to those illustrated herewith and printed in brilliant red ink to be hung in a conspicuous place. Useful hints are also given, such as arranging for one man to take each week the job of attending to all lights and fires; always providing fenders for fireplaces; keeping oil stoves on unburnable base; using lamps with metal instead of glass oil containers; stringing lamps strongly and not too near wall or ceiling, unless metal protection is provided; keeping gas burners protected by globes or wire cages, avoiding swinging brackets; providing special receptacles for smokers; avoiding inflammable decoration when arranging for entertainments; avoiding the use of celluloid articles, and keeping always available buckets of water and of sand where oil or alcohol is used.

Similarly, careful advice and instructions are prepared and placed in a conspicuous position as warnings covering the various other classes outlined herein.

The warnings contained in the illustrations with this article are also of interest at this time.

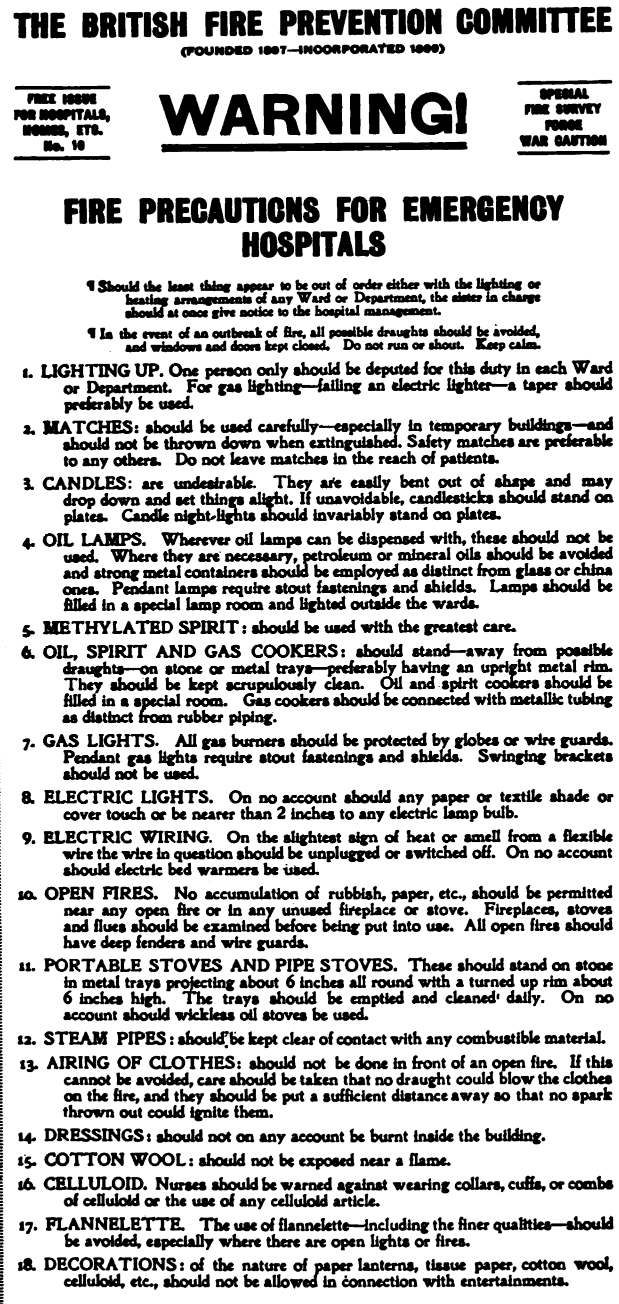
### Fire Survey Service

Surveys have been and are continually being made of such buildings as hospitals, large and small, with accommodations for many thousands of military patients, as well as for the staff; temporary buildings, hutment camps, etc., affording large accommodations, a variety of institutions used directly and indirectly for war service and emergency purposes.

### Fire Survey Force

Surveys were undertaken by various members of technical professions acting as honorary surveyors and devoting part of their time to this purpose. During the past year over 2,000 detailed reports with drawings and suggestions were completed.

All technical inquiries were dealt with by members of the force who were conversant with the particular subject in hand, while a number of retired public officials rendered valuable aid. Necessary investiga-



# THE BRITISH FIRE PREVENTION COMMITTEE

(FOUNDED 1897—INCORPORATED 1899)

FREE ISSUE
FOR HOSPITALS,
HOMES, ETC.
No. 10

# WARNING!

SPECIAL
FIRE SURVEY
FORCE
WAR CAUTION

## FIRE PRECAUTIONS FOR EMERGENCY HOSPITALS

¶ Should the least thing appear to be out of order either with the lighting or heating arrangements of any Ward or Department, the sister in charge should at once give notice to the hospital management.

¶ In the event of an outbreak of fire, all possible draughts should be avoided, and windows and doors kept closed. Do not run or shout. Keep calm.

1. LIGHTING UP. One person only should be deputed for this duty in each Ward or Department. For gas lighting—failing an electric lighter—a taper should preferably be used.
2. MATCHES: should be used carefully—especially in temporary buildings—and should not be thrown down when extinguished. Safety matches are preferable to any others. Do not leave matches in the reach of patients.
3. CANDLES: are undesirable. They are easily bent out of shape and may drop down and set things alight. If unavoidable, candlesticks should stand on plates. Candle night-lights should invariably stand on plates.
4. OIL LAMPS. Wherever oil lamps can be dispensed with, these should not be used. Where they are necessary, petroleum or mineral oils should be avoided and strong metal containers should be employed as distinct from glass or china ones. Pendant lamps require stout fastenings and shields. Lamps should be filled in a special lamp room and lighted outside the wards.
5. METHYLATED SPIRIT: should be used with the greatest care.
6. OIL, SPIRIT AND GAS COOKERS: should stand—away from possible draughts—on stone or metal trays—preferably having an upright metal rim. They should be kept scrupulously clean. Oil and spirit cookers should be filled in a special room. Gas cookers should be connected with metallic tubing as distinct from rubber piping.
7. GAS LIGHTS. All gas burners should be protected by globes or wire guards. Pendant gas lights require stout fastenings and shields. Swinging brackets should not be used.
8. ELECTRIC LIGHTS. On no account should any paper or textile shade or cover touch or be nearer than 2 inches to any electric lamp bulb.
9. ELECTRIC WIRING. On the slightest sign of heat or smell from a flexible wire the wire in question should be unplugged or switched off. On no account should electric bed warmers be used.
10. OPEN FIRES. No accumulation of rubbish, paper, etc., should be permitted near any open fire or in any unused fireplace or stove. Fireplaces, stoves and flues should be examined before being put into use. All open fires should have deep fenders and wire guards.
11. PORTABLE STOVES AND PIPE STOVES. These should stand on stone in metal trays projecting about 6 inches all round with a turned up rim about 6 inches high. The trays should be emptied and cleaned daily. On no account should wickless oil stoves be used.
12. STEAM PIPES: should be kept clear of contact with any combustible material.
13. AIRING OF CLOTHES: should not be done in front of an open fire. If this cannot be avoided, care should be taken that no draught could blow the clothes on the fire, and they should be put a sufficient distance away so that no spark thrown out could ignite them.
14. DRESSINGS: should not on any account be burnt inside the building.
15. COTTON WOOL: should not be exposed near a flame.
16. CELLULOID. Nurses should be warned against wearing collars, cuffs, or combs of celluloid or the use of any celluloid article.
17. FLANNELETTE. The use of flannelette—including the finer qualities—should be avoided, especially where there are open lights or fires.
18. DECORATIONS: of the nature of paper lanterns, tissue paper, cotton wool, celluloid, etc., should not be allowed in connection with entertainments.

¶ The sister in charge should inform herself of the best routes of exit for the inmates of her Ward or Department.

¶ The sister in charge should make herself conversant with the position, nature, and use of the Fire Appliances of her Ward or Department, and also see that her nurses and attendants are similarly informed. She should also ascertain which is the nearest source of private assistance for her Ward or Department, the nearest Fire Brigade and Police Stations, and the quickest means of communicating with them. These particulars should be posted up in her Ward or Department.

¶ The lighting, heating, exit and fire service arrangements of each Ward or Department should be inspected at least once a month by a responsible officer of the hospital management in the presence of the sister in charge.

**BUCKETS OF WATER SHOULD ALWAYS BE AVAILABLE, ALSO BUCKETS OR BINS OF DRY SAND WITH SCOOPS WHERE OIL OR SPIRIT IS USED.**

**STOUT BLANKETS ARE USEFUL FOR SMOTHERING INCIPIENT FIRES.**

*Offices of the Committee:*
*8 Waterloo Place, Pall Mall,*
*London, S.W., 1916.*

*Issued by THE BRITISH FIRE PREVENTION COMMITTEE*
*(By Order of the Executive).*

Any Technical Enquiry regarding precautionary measures in Hospitals or Convalescent Homes will be dealt with by the British Fire Prevention Committee upon written application.

(Additional Copies of this "Warning" are obtainable from the Committee.)

*Third Issue.*

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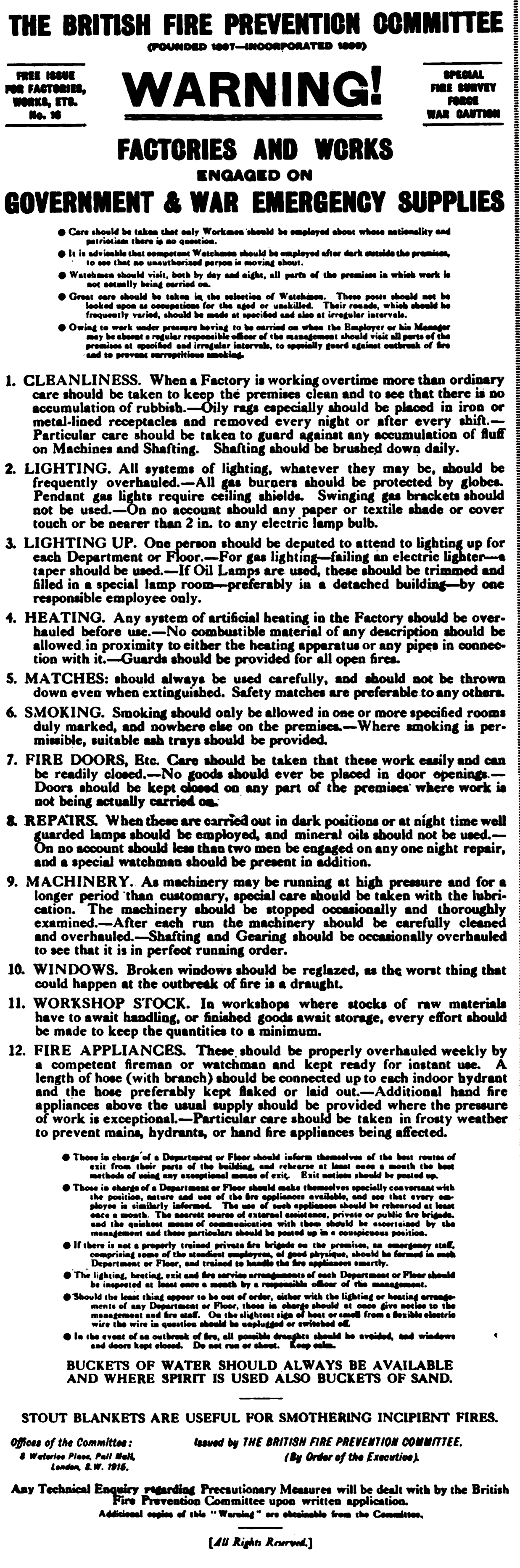

# THE BRITISH FIRE PREVENTION COMMITTEE

(FOUNDED 1897—INCORPORATED 1899)

FREE ISSUE
FOR FACTORIES,
WORKS, ETC.
No. 16

# WARNING!

SPECIAL
FIRE SURVEY
FORCE
WAR CAUTION

## FACTORIES AND WORKS
ENGAGED ON
## GOVERNMENT & WAR EMERGENCY SUPPLIES

- Care should be taken that only Workmen should be employed about whose nationality and patriotism there is no question.
- It is advisable that competent Watchmen should be employed after dark outside the premises, to see that no unauthorized person is moving about.
- Watchmen should visit, both by day and night, all parts of the premises in which work is not actually being carried on.
- Great care should be taken in the selection of Watchmen. These posts should not be looked upon as occupations for the aged or unskilled. Their rounds, which should be frequently varied, should be made at specified and also at irregular intervals.
- Owing to work under pressure having to be carried on when the Employer or his Manager may be absent a regular responsible officer of the management should visit all parts of the premises at specified and irregular intervals, to specially guard against outbreak of fire and to prevent surreptitious smoking.

1. CLEANLINESS. When a Factory is working overtime more than ordinary care should be taken to keep the premises clean and to see that there is no accumulation of rubbish.—Oily rags especially should be placed in iron or metal-lined receptacles and removed every night or after every shift.—Particular care should be taken to guard against any accumulation of fluff on Machines and Shafting. Shafting should be brushed down daily.
2. LIGHTING. All systems of lighting, whatever they may be, should be frequently overhauled.—All gas burners should be protected by globes. Pendant gas lights require ceiling shields. Swinging gas brackets should not be used.—On no account should any paper or textile shade or cover touch or be nearer than 2 in. to any electric lamp bulb.
3. LIGHTING UP. One person should be deputed to attend to lighting up for each Department or Floor.—For gas lighting—failing an electric lighter—a taper should be used.—If Oil Lamps are used, these should be trimmed and filled in a special lamp room—preferably in a detached building—by one responsible employee only.
4. HEATING. Any system of artificial heating in the Factory should be overhauled before use.—No combustible material of any description should be allowed in proximity to either the heating apparatus or any pipes in connection with it.—Guards should be provided for all open fires.
5. MATCHES: should always be used carefully, and should not be thrown down even when extinguished. Safety matches are preferable to any others.
6. SMOKING. Smoking should only be allowed in one or more specified rooms duly marked, and nowhere else on the premises.—Where smoking is permissible, suitable ash trays should be provided.
7. FIRE DOORS, Etc. Care should be taken that these work easily and can be readily closed.—No goods should ever be placed in door openings.—Doors should be kept closed on any part of the premises where work is not being actually carried on.
8. REPAIRS. When these are carried out in dark positions or at night time well guarded lamps should be employed, and mineral oils should not be used.—On no account should less than two men be engaged on any one night repair, and a special watchman should be present in addition.
9. MACHINERY. As machinery may be running at high pressure and for a longer period than customary, special care should be taken with the lubrication. The machinery should be stopped occasionally and thoroughly examined.—After each run the machinery should be carefully cleaned and overhauled.—Shafting and Gearing should be occasionally overhauled to see that it is in perfect running order.
10. WINDOWS. Broken windows should be reglazed, as the worst thing that could happen at the outbreak of fire is a draught.
11. WORKSHOP STOCK. In workshops where stocks of raw materials have to await handling, or finished goods await storage, every effort should be made to keep the quantities to a minimum.
12. FIRE APPLIANCES. These should be properly overhauled weekly by a competent fireman or watchman and kept ready for instant use. A length of hose (with branch) should be connected up to each indoor hydrant and the hose preferably kept flaked or laid out.—Additional hand fire appliances above the usual supply should be provided where the pressure of work is exceptional.—Particular care should be taken in frosty weather to prevent mains, hydrants, or hand fire appliances being affected.

- Those in charge of a Department or Floor should inform themselves of the best routes of exit from their parts of the building, and rehearse at least once a month the best methods of using any exceptional means of exit. Exit notices should be posted up.
- Those in charge of a Department or Floor should make themselves specially conversant with the position, nature and use of the fire appliances available, and see that every employee is similarly informed. The use of such appliances should be rehearsed at least once a month. The nearest source of external assistance, private or public fire brigade, and the quickest means of communication with them should be ascertained by the management and these particulars should be posted up in a conspicuous position.
- If there is not a properly trained private fire brigade on the premises, an emergency staff, comprising some of the steadiest employees, of good physique, should be formed in each Department or Floor, and trained to handle the fire appliances smartly.
- The lighting, heating, exit and fire service arrangements of each Department or Floor should be inspected at least once a month by a responsible officer of the management.
- Should the least thing appear to be out of order, either with the lighting or heating arrangements of any Department or Floor, those in charge should at once give notice to the management and fire staff. On the slightest sign of heat or smell from a flexible electric wire the wire in question should be unplugged or switched off.
- In the event of an outbreak of fire, all possible draughts should be avoided, and windows and doors kept closed. Do not run or shout. Keep calm.

**BUCKETS OF WATER SHOULD ALWAYS BE AVAILABLE AND WHERE SPIRIT IS USED ALSO BUCKETS OF SAND.**

**STOUT BLANKETS ARE USEFUL FOR SMOTHERING INCIPIENT FIRES.**

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Reproduction of emergency bulletins distributed
by British Fire Prevention Committee

tions, such as tests as to the best means for minimizing the effect of incendiary bombs, were conducted by a special committee.

In the conduct of the work, close touch was invariably kept with the various departments of the Government and the military and medical authorities concerned. This work has resulted in a substantial reduction of the direct and indirect loss of property and lives by fire.

### Conditions in United States

The particular importance of the active fire prevention efforts in the United States during the present conditions and the need for this work have been clearly proven by the various incendiary fires and resultant explosions incidental to munition and war supply work in this country before the declaration of a state of war with the Central Empires.

### War Emergency Fire Prevention

All fire prevention engineers and others interested in the matter of avoiding fire losses should at this time give particular thought and attention to the possibility of numerous incendiary fires and others which must of necessity arise from the increase of hazardous lines of manufacture incident to the state of war in which the United States has entered.

Undoubtedly the services of the National Board of Fire Underwriters or of members of the National Fire Protection Association will be offered to, and accepted by, the Government in connection with the matters of fire prevention and fire protection. Probably a distinct arm of the service, a corps of fire prevention engineers, will have this matter in charge. It is quite possible, indeed, that the matter may be taken up at the annual meeting of the National Fire Protection Association to be held in Washington early in May.

At all events the work of this nature, which has been done so successfully by the British Fire Prevention Committee, will be of interest to the readers of this publication, and many excellent suggestions will be gained therefrom.

## *Object Lesson for Louisville*

COMMENTING upon the burning of the large and expensive properties of the Kentucky Public Elevator Company, at Louisville, Ky., on February 25, last, an eyewitness of the fire and a competent critic thereof, said in part:

"The efforts of the fire department were principally directed toward watching the property in the menaced area. It was the finest indictment against shingle roofs that was ever delivered in Louisville."

The construction of the elevator building was as here given: Frame, iron-clad, with open beams and joists; bins of crib construction; floors single, stairways and miscellaneous floorway openings. Area 90 x 190; 70 feet to cupola and 147 feet to top of building.

The boiler and engine rooms were of one-story, ordinary brick construction, with open finish and communicating with elevator through openings protected by unapproved fire doors.

The grain dryer was a three-story fireproof structure, with brick walls, concrete floors and roof. Communication was with elevator through small unprotected conveyor openings.

The grain tanks, sixteen in number, were of reinforced concrete construction, circular in form, the 7-inch walls being 87 feet high.

### Protection Employed

The private fire protection of the plant consisted of water barrels and buckets distributed throughout the elevator building: One 3-inch standpipe near center of building with 100 feet of 2-inch hose on first and 50 feet on each of other floors; automatic fire alarm service, and patrol watch service.

### Rapid Spread of Fire

Fire broke out in the late afternoon. Within two minutes after the initial alarm had been recorded a general alarm was sounded, calling out practically the entire fire fighting force of the city. The wind blowing at 35 miles an hour, which later increased to 40 miles, greatly increased the danger of a general conflagration. The air was filled with brands, which fell like snow for nearly a mile. As a result of this, six alarms were sent in and numerous buildings were ignited that were put out by the property-owners or volunteers. Many buildings in the path of the wind and within a thousand feet were repeatedly ignited. The efforts of the fire department were principally directed toward watching the property in the menaced area. It was the finest indictment against shingle roofs that was ever delivered in Louisville.

As a result of the fire the elevator building and its equipment was a total loss. The fireproof grain dryer, though almost directly in the path of the wind, was probably not seriously damaged.

The reinforced concrete tanks nearest the elevator were spalled to a considerable extent, and in a few places to a depth of three and one-half inches.

The fire, serious though it was, has no new lessons for students of fire safety. It graphically emphasized the menace of wooden roofs and the safety afforded by such portion of the plant as was of fireproof construction. May these truths not be lost upon the people of Louisville.

# *Lessons Taught by Motion Picture Studio Fire*

Realizing that experience is often the best teacher, the report of the Bureau of Surveys of the New York Board of Fire Underwriters, on a recent motion picture studio fire in New York City, is given here for the purpose of pointing out defects and weaknesses in building construction, equipment and general practice peculiar to the business involved. Such defects and weaknesses exist in many similar properties, and their correction and avoidance may be the means of saving others from fire loss.—Editor.

THE fire occurred on January 3, 1917, at 226-232 West Thirty-fifth street, New York City. This building was originally constructed for and occupied as a church. Due to its large floor area it was easily changed into a motion-picture studio. The building was two stories, basement and blind attic in height, with one small mezzanine between first and second floors and two mezzanines between second floor and roof. The walls were brick, independent, 16 inches by 12 inches, reinforced by brick pilasters. The finish was part plastered direct and part on wood furring. Partitions were few of plaster on wood lath and studs, except metal on wood studs on part of first. The roof was slate on roof boards, on rafters and heavy wood trusses. There were no skylights. The floors were single on first and mezzanines, double ⅞ inch on ⅞ inch on second; the first floor was supported on wood girders, on posts and brick piers, and the second on triple 3-inch by 12-inch girders on twin 4-inch by 12-inch longitudinal girders on wood posts and side bearing walls. Ceilings were lath and plaster. Floor openings were three wood stairs; also one iron stairs, slate treads on sheet iron web plates in brick shaft with wooden doors to floors. One elevator not enclosed first to second, with a wood trap door, not automatic at second. One opening 4 feet by 6 feet basement to first, with a wood trap door, not automatic at first.

### Occupancy

Popular Plays and Players' Company leased the building from the Colonial Motion Picture Corporation and occupied the entire building.

Basement—Storage of property; boiler room.

First—Storage of property; carpenter and scene-painting shops, water colors used, one gas range; developing, washing and drying film in rooms of metal on wood studs.

First mezzanine—Storage of property and office records.

Second—Studio with cameras, lights, dressing rooms, etc.

Second mezzanine—Front—Offices; sixty-one reels in cans on floor.

Rear—Assembling and examining film; three examining and joining reels on metal table with electric lights in tables, one polishing machine by motor, about fifty-nine reels, part in cans, one Simplex motion-picture machine.

### How Discovered

A civilian on the street, seeing smoke coming from the building, rang in an alarm from a public fire alarm box at 12.25 P. M.

### Origin and Spread

The tables on which film was joined or examined had an electric light in them, located in a well and covered by a heavy piece of glass. The glass cover in one of these tables was very loose fitting; in fact, it was not the original glass made for the opening. While an employee was joining a reel on this table the electric light globe broke. It is thought the heavy glass cover fell on the globe, and, as a result, the film on the table caught fire. Some of the employees tried to put the fire out by throwing the film on the floor and stamping on it, but were not successful. The flames ignited other films in the vicinity, some of which were not in cans. There were about fifty-nine reels, part in cans, a few of which were in a single wall metal cabinet at the time of the fire. The fire spread over the entire rear mezzanine on the second floor, roof and main part of the studio and filled the premises with an irritating dense smoke. Some of the employees had difficulty in getting to the street, due to the smoke.

### How Extinguished

By public fire department. The first alarm was received at 12.25 P. M., but when the fire department arrived and saw what headway the fire was making, a second and third alarm were sent in at 12.29 and 12.34 P. M., respectively, calling out a total of ten engine companies, four hook and ladders, one water tower and one rescue company.

### Loss of Life

None, but several employees were burned about the hands and arms while trying to put the fire out when it started.

### Property Loss

The fire did not get below the second floor and was practically confined to the rear second floor mezzanine, roof and studio. The heavy wood roof girders were badly charred, but did not burn through. The property on the first floor and basement and clothing belonging to employees were damaged by smoke and water. There was about 3 feet of water in the basement after the fire. Offices and contents, including sixty-one reels in cans on floor on second mezzanine in the front of the building, were not damaged except by smoke and water. The heat from the fire burned some wood

(*Continued on page 182.*)

## For Betterment of the Hollow Metal Window Industry

ALL details in connection with the creation of the National Association of Manufacturers of Hollow Metal Window Frame and Sash having been completed, the organization is now at work, determined to place the hollow metal window industry upon that plain which its importance warrants.

The purpose of the association, as set forth by its management, is: "The promotion of the hollow metal window industry and the enlarging of its scope that Underwriters' labeled windows with wireglass may be obtainable for all classes of openings in buildings; that is, for mild, medium and severe exposures, etc., also for the purpose of disseminating such information as may be of service to architects, oners and builders.

Upon request, members of the organization will not only furnish architects, contractors or property-owners full informations regarding hollow metal frame and sash, but if desired, will personally call upon those interested and go over in detail the best means of using the product in order to secure the maximum of fire resistance for a building and the minimum insurance rates thereupon.

Through close and constant co-operation the association members plan to keep posted upon the latest developments affecting their product in every part of the country; promptly placing the result of information thus had at the disposal of their clients.

From the subjoined list of charter members it will be appreciated that the new organization already has powerful support, and it is a safe prediction that other individual, firm and corporation manufacturers will speedily join the body once they become properly acquainted with its plans and practices.

The charter members are: Biersach & Niedermeyer, Milwaukee; Consolidated Sheet Metal Works, Milwaukee; Herrman & Grace Company, Brooklyn; Knisley Brothers, Chicago; Harry C. Knisley Company, Chicago; Thomas Lee, Cincinnati; Leonard Sheet Metal Works, Hoboken; J. G. McFarland Company, Chicago; James A. Miller & Brother, Chicago; Perkinson & Brown, Chicago; Powers & Boyde Roofing and Cornice Company, St. Louis; Rasner & Dinger Company, Pittsburg; Reister & Thesmacher, Cleveland; J. F. Ruth, St. Louis; F. O. Schoedinger Company, Columbus; The Sykes Company, Chicago; C. E. Trulock, New York city, E. Van Norden Company, Boston; Voightman & Co., Chicago; T. P. Walsh, San Antonio; Henry Weiss Co., Atchinson; M. F. Westergren, Inc., New York, and the Willis Manufacturing Company Galesburg.

Fred de Coningh, of The Sykes Company, is president of the organization; J. C. McFarland, of McFarland Hyde Company, vice-president, and Thomas F. Sheean, of Knisley Brothers, secretary.

Committees on Construction and on Publicity have already been named; other standing committees will be appointed doubtless from time to time, as the need for such action becomes apparent.

Those named to serve upon the Construction Cormittee are: Fred de Coningh, of The Sykes Company; J. C. McFarland, of McFarland Hyde Company; Fred Voightman, of Voightman & Co., and John Bogenberger, of the Consolidated Sheet Metal Works.

The publicity work of the association will be directed by John J. Grace, of Herrman & Grace; M. F. Westergreen, and E. R. Leonard, of the Leonard Sheet Metal Works

While the offices of the organization are at 930 West 19th place, Chicago, complete information as to its workings may be had from any of the following:

John J. Grace, 673 Bergen street, Brooklyn; M. F. Westergren, 213 East 144th street, New York; E. R. Leonard, 1270 Broadway, New York, and C. E. Trulock, 280 Madison avenue, New York, the last-named having served as secretary of the gathering during the formation of the association.

## Lesson of Motion Studio Fire

(*Continued from page* 181.)

window sash and frame on dwelling in rear of building, but little damage was done.

### Conclusions

The importance of segregating motion-picture studios and factories, and the necessity for automatic sprinklers in connection therewith, was illustrated by the fact that the contents of this film department furnished exceptionally inflammable fuel for the fire.

This fire would seem to justify the regulations of the fire department requiring a special permit and rigid safeguards for the storage of inflammable films in excess of five reels (5,000 feet).

The practice of having electric lights in film-examining tables should be discouraged as much as possible. The danger may be somewhat reduced by making the heavy glass over the top of the light well permanent; also the bottom of the well should be removed so no pieces of film can lodge around the electric light globe.

## Due to Defective Flues

TWO hundred and ninety-six fires occurred in Kansas during the month of January, according to State Fire Marshal L. T. Hussey. The property loss resulting therefrom aggregated $257,586. Of the known causes of the fires the greatest number were from 'sparks on roofs," defective chimney flues next following. Remove these two important fire hazards and the fire loss not only of Kansas but of every other State in the Union would at once show a marked reduction.

# National Fire Resistance Council

WE, in the United States, will doubtless be spared the devastation visited upon some of the European countries through the awful destruction of buildings by high-explosive shells, which nothing seems able to withstand.

But, we are now at war, and what about incendiarism?

During the Commune of Paris, and just before the defeat of the Communists by Maréchal MacMahon, they endeavored to burn Paris on a grand scale, using petroleum and explosives to accomplish their purpose in many parts of the city.

But Paris did not burn, because the buildings generally were well constructed of fire-resistive materials, particularly the floors.

To-day is is claimed that 95 per cent of the buildings of Paris are so constructed, and its fire loss is one-eighth to one-tenth of the fire losses in large American cities.

To-day *we* are at war, and the thought and fear of incendiarism is in men's minds.

Is it not a fact that we would have little to fear if our buildings, generally, were fire-resistive?

The producers of fire-resistive and protective materials and devices, and the constructors of fire-resistive and protected buildings, have a patriotic duty to perform in banding together to greatly increase the number of such buildings.

Join the National Fire Resistance Council and help accomplish these results quickly.

### Good Housing and Health

These two things go hand in hand; a bill is now before the Legislature of New York to amend the Tenement House Law, by permitting old, single, three-story houses to be converted into three-family flats.

In the proposed amendment the bars are let down and safeguards removed, permitting inferior construction in certain parts of such converted buildings.

The danger is that such retrogressions would become effective in the whole existing law.

The proposed law is, properly, being opposed by the Tenement House Commission and by civic and good housing bodies.

The Health Commissioner of the city of New York strongly opposes the proposed law, because of the danger of tuberculosis in such buildings and points out the dangers from vermin.

The fire underwriters are opposed to the proposed law, because of the increase in fire hazards.

The National Fire Resistance Council is opposing it in the interest of good construction, fire prevention and health.

### Standardization of Fire Tests

The United States Bureau of Standards has created an Advisory Committee on Fire Tests of Wall Construction; the chairman of the National Fire Resistance Council is a member of this committee.

A programme of fire tests has been determined upon and mapped out to determine relative values in fire resistance of various types of walls and partitions.

Such work should be done by the United States Government as extensively as possible, and to this end the National Fire Resistance Council will work for larger appropriations for the Bureau of Standards by Congress.

*You* can help in this work by joining the National Fire Resistance Council.

### Classifications of Materials by Tests

We acn only intimate, at this time, that definite and important progress is being made in this great work, and that in this progress many influential bodies are co-operating.

### Housing of Industrial Workers

A great awakening is occurring in our country to this matter, and this is of vital interest to the members of the National Fire Resistance Council, and to all workers for good construction and good housing conditions; in European lands, especially in England and Germany, the larger industries have developed the idea of industrial housing to a very high degree, and the business heads and governmental bodies co-operate fully to produce the best conditions of fire-safety, sanitation, and the comfort and contentment of their vast industrial populations.

One of the very great sources of economic waste in the United States is the frequent changes of location and employment by the working people, a large part of which can be eliminated by the development of attractive, safe and wholesome housing.

Properly built, well-protected homes and schools, thorough sanitation, attractive surroundings and provision for recreation, all make for contentment, better work, higher return for labor and better citizens.

The National Fire Resistance Council offers a nation-wide medium for the realization of these ideals.

### The Asbury Park Fire

The recent fire at Asbury Park, N. J., presents a forceful argument in favor of firesafe construction; consider for a moment the total direct loss by this conflagration—over a million dollars; think of the business the approaching season would have afforded had the hotels and houses not been destroyed; property of great value wiped out in a few hours.

The National Fire Resistance Council is devoted to the amelioration of these conditions and invites your co-operation and membership.

## Cleaning Up the Nation

LETTERS are being written to the Governors and fire marshals of the different States, and to the mayors, fire chiefs, health officers and Chambers of Commerce in several hundred of the leading American cities, urging that the first week in May (which this year begins upon April 30), be designated and observed generally as a spring "Clean-up Week."

This is a time of national crisis, when every effort to reduce public hazard becomes a patriotic duty. However, such efforts pay abundant dividends even under normal conditions. For example, J. J. Conway, chairman of Cincinnati's "Clean-up and Paint-Up" campaign, writes to the National Board of Fire Underwriters:

"Cincinnati's clean-up campaigns have been of great value to the people of Cincinnati. Prior to the first campaign three years ago, the fire loss totaled $1,340,000, and this was reduced to $370,537 in 1915, and to approximately the same figure in 1916."

Similarly, the city of Decatur, Ill., reports a fire loss of $164,010 for 1915, before the institution of the local clean-up campaign, and of only $63,457 for 1916, following this effort. As one of the features of Decatur's campaign, more than 150 merchants provided themselves with metal receptacles for the storage of waste paper and rubbish.

### What One City Accomplished

The Chamber of Commerce of Rochester, N. Y., states that the city's 1916 fire loss showed a reduction of 40 per cent over the figures for 1915, and credits a large part of this to the result of a clean-up campaign. Mayors, fire chiefs and health officers in a number of cities, as well as the fire marshals of Pennsylvania, Illinois, Michigan, Ohio, Wisconsin, Minnesota and several other States, are already moving actively in the matter. On the other hand, the greater part of the United States has not yet awakened to this necessity.

Spring is a time of peculiar fire menace because of the accumulated litter of the winter months. The Georgia Fire Prevention Society has published statistics showing that all of the conflagrations in the Southern cities during the past quarter of a century have occurred between February 25 and May 3, and it is well known that the $350,000,000 conflagration in San Francisco was in the month of April. While this latter was caused by an earthquake, most of the loss was due to the bad condition of the city. If a spring "Clean-up" campaign could be established as a national institution, for the first week of May each year, it would save millions of dollars of the national wealth, which is annually destroyed through unnecessary fires. It also would be a most important health measure, since dirt and debris breed disease as well as conflagration.

One word of special precaution is necessary; this refers to the storage of waste paper. Following the suggestion of the Federal Government that people should save waste paper as a means of meeting the serious shortage in paper stock, thousands of school children began to collect paper and store it in school basements, thereby creating a hazard. It is desirable that waste paper should be conserved, but a safe place of storage should be provided. *Such storage should never take place in schools or dwellings.* It is well to remember that paper is less likely to burn when tightly folded and piled than when thrown into a loose heap. It should be disposed of as frequently as possible so that large quantities may not accumulate. This is another case in which individual carelessness is the greatest fire hazard.

## Co-Operating with the Government

EMPLOYEES of the Underwriters' Laboratories are urged by President W. H. Merrill to be unusually accurate and expeditious in their work, aiding thereby the war program of the Federal Government.

In his letter to the staff, Mr. Merrill says:

"Materials and appliances bearing the labels of Underwriters' Laboratories are being specified as munitions.

"Two representatives of the Government were here on the eighteenth planning for the utilization of our service of inspection at factories turning out munitions.

"Our New York office advises that the Navy Department has placed orders with the various factories for a million feet of No. 14 duplex leaded wire for immediate delivery, goods subject to our inspections and labeling.

### Standards Must Be Maintained

"All officers and employees being in this Government service with us will appreciate the vital importance of registering one hundred per cent efficiency in our service on war munitions. There must be no failure in field service or on shipboard of any device, material, or appliance examined, tested and passed by us.

"Officials of the Government feel that our engineering corps can render a greater service to the country by working from the shoulders up than from the shoulders down. They have given us a chance to aid promptly in the present crisis, in a very practical and important way. Let us accept these responsibilities as a further vital incentive to

"Accuracy, Thoroughness, Expedition and Efficiency."

# Heat Insulating Values of Various Roofings for Large Buildings

*The following is an interesting record of a series of careful tests to determine the heat insulating value of Metropolitan gypsum composition roofs.*

*These tests were made by Prof. C. L. Norton, at the Rogers Laboratory of Physics, Massachusetts Institute of Technology, and has extended over a period of nearly two years.*

*As considerable interesting data in regard to heat flows through various roofing materials has been obtained in the course of these tests, the completed record is given herewith.*

THE effectiveness of a roof in preventing the flow of heat through it is of importance mainly from two considerations. First, because a roof which is a good insulator saves cost of installation and operation of the heating plant; and second, because a roof of better insulating value is less likely to become troublesome from condensation of moisture upon its under surface.

For the purpose of determining the general thermal properties of the plaster (Gypsum) composition roofs, known as Metropolitan roofs, a series of experimental tests were undertaken early in 1914, and have been carried on continuously ever since.

### Materials Examined

For the purpose of test, specimens of Metropolitan composition slabs were submitted by the manufacturers, the Keystone Fireproofing Company of New York. The material of which the slabs were composed was found to be approximately 85 per cent of calcined gypsum and 15 per cent of wood fibre. For comparison, roofing materials of other types were secured from local builders or dealers. Among the materials tested were the following:

Metropolitan Composition.
Terra Cotta Hollow Tile.
Portland Cement Concrete.
Tar and Gravel Roofing.
Spruce Plank.
Oak Plank.
Compressed Sheet Cork.
Asbestos Protected Metal.

### Method of Testing

To test the rate of heat flow through the specimens, apparatus was used which was built for somewhat similar work some years ago, and is described in a paper on "Thermal Properties of Concrete," by the writer, in the *Journal of the American Society of Mechanical Engineers*, Vol. XXXV, 1913, page 1011.

Specimens of various sizes up to 48 inches square and 4½ inches in thickness were tested, and subsequently an experimental roof of concrete was built to check the values obtained with the smaller laboratory specimens. This slab was made the roof, or cover, of a box whose floor and walls were built of thick sheet cork of known heat conductivity. Heat was supplied to the box electrically until the desired temperature difference between the air inside and outside of the box was reached. From the electrical supply and the known loss through the cork floors and walls, the amount of heat flowing out through the roof might be computed. Numerous fine thermal junctions were inserted throughout the whole structure so that temperatures of the body or surfaces of the slabs, as well as the surrounding air and adjacent objects, might be measured.

It may be of interest to note that the apparatus, with minor changes for particular materials or for measurements at unusual temperatures, has been in practically continuous use for fifteen years, testing materials of building construction or in research on the nature of insulators.

### Results

With the apparatus described, two sets of physical constants were secured, one a series of values of the rate of heat flow through the solid substance of the roof slab, usually called the coefficient of thermal conductivity; and second, a number of values of the rate at which heat escapes from, or passes into, a surface, when the surface and the air surrounding it are at different temperatures. These latter values are usually referred to as the coefficients of emission or absorption, and, so far as the experiments show, the two coefficients are substantially alike, and will be considered to be identical under the conditions of these tests.

The coefficient of thermal conductivity is the numerical measure of the heat-conducting value of the material. It may be expressed in any suitable units, but for convenience, in this report English units and degrees Fahrenheit will be used, and twenty-four hours has been selected for the time unit, mainly because, with the materials here reported upon, it gives numerical values which are of convenient size.

The coefficient of emission is expressed as the amount of heat which a square foot of surface will give off when exposed to air one degree cooler than itself. Since the nature and size of adjacent bodies, the velocity of air currents, and the size and condition of the surface itself, all affect this quantity slightly, it will be possible to give only such a value as will apply to the exposures which approximate to those of roofs in general. It must be borne in mind, however, that the emission and absorption coefficients play a minor part in the determination of the insulating value, and also that the coefficients are practically the same for all the materials under test, and hence any uncertainty as to their values will affect the absolute value of them all, but not the relative values of one to another.

If we know the area and thickness of a roof, the coefficients of absorption, conduction and emission, and the temperature of the air on the two sides of the slab, we may compute the amount of heat flowing through it, and also the temperature of its two surfaces. If we have the data for two or more roofs, we may in this manner compare them. The presence of snow, of winds, sunshine or of rain will affect the absolute amount passing through a roof for a given temperature difference, but, so far as our experiments show, all materials are affected in the same manner and to sensibly the same degree by the variations of exposure.

All of the values of coefficients in the tables are computed from observations made with temperature differences such as are common upon the surfaces of roofs and in the air in their immediate neighborhood. For the surface coefficients, differences of five to ten degrees were used, and the conduction coefficient was based upon measurements made with differences of from ten degrees to one hundred and twenty.

TABLE 1.—COEFFICIENTS OF THERMAL CONDUCTIVITY

| Material | B.t.u. per sq. ft. per 1" thick, per 1° F. diff. in temp. of surfaces, per 24 hours. | |
|---|---|---|
| Compressed sheet cork | 8 | |
| Spruce plank | 18 | |
| Metropolitan gypsum slab | 20 | |
| Oak plank | 26 | |
| Roofing paper and pitch | 33 | |
| Hollow tile terra cotta | 40 | Applies only to 3-in. tile. |
| Cinder concrete | 120 | |
| Stone concrete | 150 | |
| Asbestos protected metal | — | 196 for ⅛" thickness. |

Most of the materials are homogeneous and their effectiveness is directly proportional to their thickness, provided the surface temperatures are kept constant. The value for Hollow Terra Cotta Tile applies for purposes of computation only to a roof 3 inches in thickness, as the constant is not the same for Tiles of other thicknesses. Similarly the Asbestos Protected Metal is not a homogeneous material, and it is not wise to attempt to deduce the value for other thicknesses of this material from the one thickness tested.

The figures in Table 1 do not involve any consideration of the temperature of the air in contact with the surfaces, but merely the temperature of the surfaces themselves. For instance, a square foot of corkboard, 1 inch thick, when so exposed that the air on one side is as 72 degrees F. and on the other at 35 degrees F., would have surface temperatures of about 68 degrees F. and 43 degrees F., and would transmit

$$8.0\ (68\text{-}43) = 200 \text{ B. t. u. per 24 hours.}$$

If the cork were 2 inches thick the temperatures of the surfaces would not be the same as in the case of the 1-inch slab, but would be 69 degrees F. and 42 degrees F., and the transmission would be

$$8/2\ (69\text{-}42) = 104 \text{ B. t. u. per 24 hours.}$$

For substances which are not so good insulators as cork the lack of proportionality of several thicknesses is much greater.

The temperatures of the surfaces just referred to are obtained from the results of an elaborate series of tests, the summary of the results of which is given in Table 2 below:

TABLE 2.—COEFFICIENTS OF EMISSION

| Nature of Surface | Loss or gain of heat in B.t.u. per sq. ft. per 24 hours per 1° F. difference in temp. of air and of surface. |
|---|---|
| Compressed sheet cork | 36 |
| Roofing paper | 50 |
| Concrete | 55 |
| Metropolitan composition | 57 |
| Asbestos protected metal | 54 |
| Terra cotta | 54 |

Excepting the value for cork the coefficients are practically alike. Many other materials have been found to have about the same value, approximately 55, but some, especially the fibrous surfaces like cloth, wood and unsaturated paper, have values lying between 40 and 50. These values hold only for small differences in temperature, and for still air.

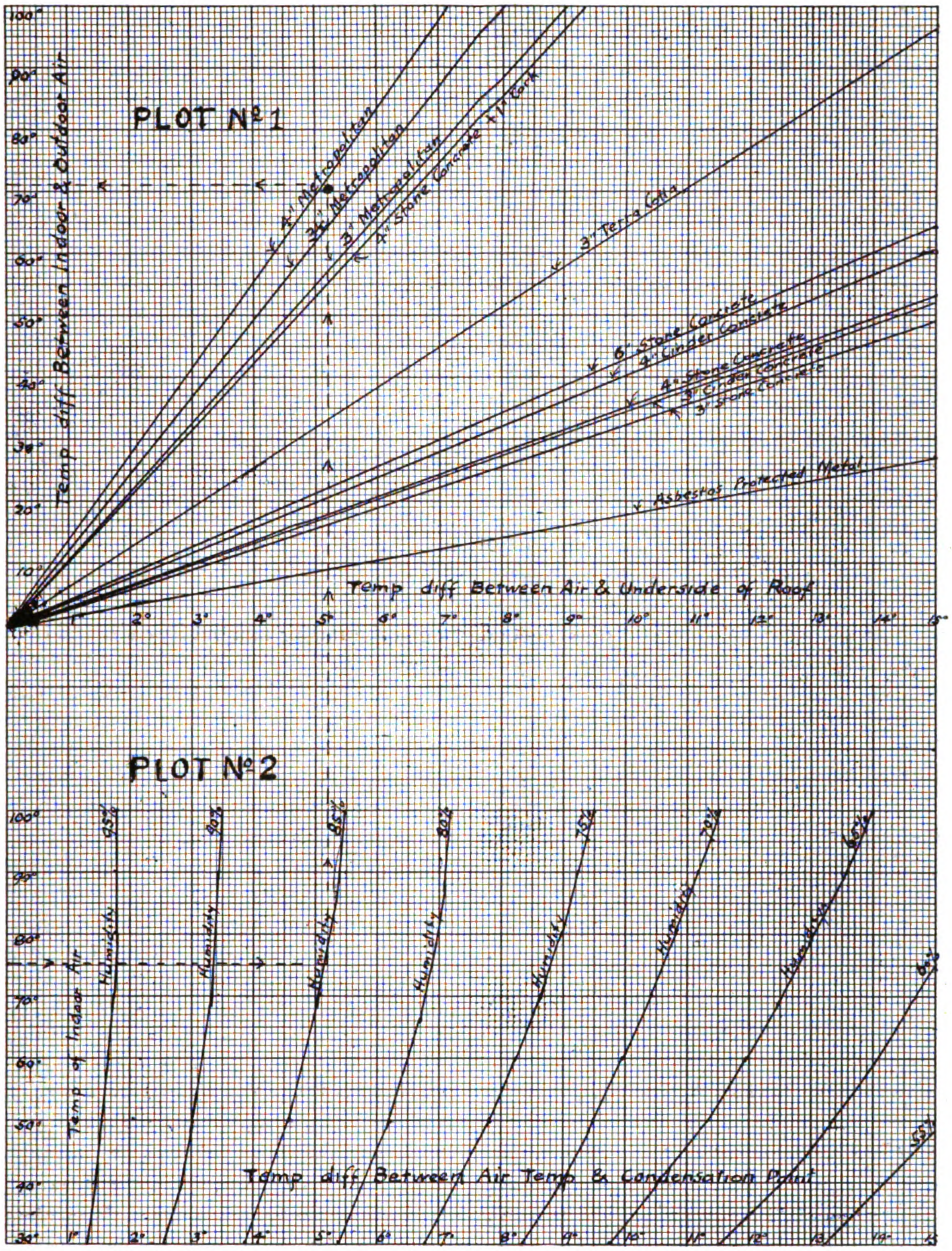
In order to compute the heat flow through any typical roof we must proceed along the line of the following example. Let us take the case of two slabs, *A*, a slab of Metropolitan Composition, and *B*, a slab of Stone concrete, each 4 inches thick, and upon the surface of each a five-ply built-up tar-and-felt roofing sheet ¼ inch thick.

From Table 1 we find the coefficient of conduction for the slab *A* is 20 for the Metropolitan and 33 for the roofing. From Table 2 we find that the emission coefficient for Metropolitan is 57, and for the roofing paper is 50. These figures show us how many British thermal units will flow through parts of the slab for 1 degree difference in temperature, and the reciprocals of these constants will give us the amount of the temperature difference when one British thermal unit is passing through the specimen.

Thus if heat flowed through slab *A* at the rate of one British thermal unit per 24 hours per square foot, it is due to a temperature difference given by the following equation:

$$\frac{1}{57} + \frac{4}{20} + \frac{1/4}{33} + \frac{1}{50} = .245^\circ \text{ dif. air to air;}$$

and if a temperature difference of .245 in the air on the two sides of the roof will cause a flow of one Brit-



Graphic Chart of Results of Tests

ish thermal unit, then a temperature difference of 1 degree will cause

$$\frac{1}{.245} = 4.08 \text{ B. t. u.}$$

to flow. Similarly the flow through slab *B* is

$$\frac{1}{\frac{1}{55}+\frac{4}{150}+\frac{1}{4 \times 33}+\frac{1}{50}} = 13.8 \text{ B. t. u. for } 1^\circ \text{ diff. air to air.}$$

The two values, 408 and 13.8, give the amount of heat which will pass through the two roof slabs under the same conditions, and show that as an insulator the Metropolitan roof is 3.39 times as effective as concrete.

In this manner the Table 3 has been computed, to show the relative values of some half dozen of the roofs tested.

From the values given in this table we may also estimate the actual loss through roofs of these types and may compute the actual saving in fuel, if we have reliable information as to average temperature conditions and efficiency of heating plant. Practically all of the material used in the construction of roofs is subject to some variation in composition or structure. In the Portland Cement concrete a great variation has been noted, dependent upon the nature of the aggregate, the amount of water used in mixing, the conditions of temperature and moisture during setting, and the extent of the tamping. The figures given for concrete are averages, variations of 30 per cent between different specimens have been noted.

TABLE 3.—HEAT TRANSMISSION THROUGH ROOFS

| Construction | B.t.u. transmitted for 1° difference in temp. of air inside and out, per 24 hours. |
|---|---|
| No. 1—Metropolitan composition 4″ thick with 5-ply tar and felts.................... | 4.08 |
| No. 2—Metropolitan composition 3½″ thick with 5-ply tar and felts............... | 4.55 |
| No. 3—Metropolitan composition 3″ thick with 5-ply tar and felts............... | 5.14 |
| No. 4—Hollow terra cotta tile 3″thick with 5-ply tar and felts.................. | 8.35 |
| No. 5—Stone concrete 6″ thick with 5-ply tar and felts ........................... | 11.7 |
| No. 6—Cinder concrete 4″ thick with 5-ply tar and felts ........................... | 12.2 |
| No. 7—Stone concrete 4″ thick with 5-ply tar and felts ........................... | 13.8 |
| No. 8—Cinder concrete 3″ thick with 5-ply tar and felts ........................... | 14.1 |
| No. 9—Stone concrete 3″ thick with 5-ply tar and felts ........................... | 15.2 |
| No. 10—Asbestos protected metal ⅛″ thick..... | 23.7 |
| No. 11—Stone concrete 4″ thick with 1″ cork and 5-ply tar and felts............ | 5.08 |

The condensation of moisture on the under surface of a roof begins when the surface has cooled down to what is called the dew-point. Hence we need to compute from our experimental values what the temperature of the lower face of a roof will be for different indoor and outdoor temperatures, if we wish to discuss the relative freedom from condensation of the several types of roof.

Let us refer again to the slab *A*, described earlier. Since we know the value of its coefficients we may show that the ratio of the temperature drop at the undersurface to the entire temperature difference between the air inside and out, is

$$\frac{\frac{1}{57}}{\frac{1}{50}+\frac{1}{57}+\frac{1}{132}+\frac{4}{20}} = .072^\circ \text{ F.:}$$

that is, for every degree temperature difference between the air inside and out the under side of the roof will be .072 degrees cooler than the air below it.

For ease in computation the following plots were drawn. The amount by which the dew-point is lower than the temperature of the air itself is commonly called the depression of the dew-point. It varies with the relative humidity or degree of saturation of the air. The *depression of the dew-point* is merely another name for the difference in temperature between the air in the room and the condensation point. It is the amount by which a surface in a room must be cooled down below the room temperature in order to have moisture condense upon it. The plot, No. 2, showing the depression of the dew-point for different temperatures and humidities, is computed from the "Smithsonian Meteorological Tables." Plotted above it, with the same scale of abscissæ, is Plot 1, giving the relation between the temperature difference between the indoor and outdoor air, and the temperature drop between the under side of the roof and the air below. This double plot will enable us to tell at just what temperature and humidity we may expect to find condensation beginning, or in cases where the temparature and humidity are fixed we may find at what outdoor temperature condensation will begin on the under surface of the roof.

Let us take the case of a Metropolitan roof 4 inches thick with five-ply top. We will assume, for example, that our room temperature is 75 degrees F. and the humidity is 85 per cent. From Plot 2 we find that the difference between the air temperature and the condensation point for these conditions is 5.1 degrees F. Entering the Plot No. 1 with this value we find that the drop from the under side of the 4-inch Metropolitan slab reaches a value of 5.1 degrees F. when the difference between the indoor and outdoor temperature reaches 71 degrees F., which corresponds to an outdoor temperature of 4 degrees F. Similar deduction may be made from these plots in reserve order, to determine permissible humidity for fixed outdoor temperatures.

It will be noted from a consideration of Plots 1 and 2 that with an ordinary room temperature there is no possibility of condensation on the under side of a Metropolitan slab 3 inches, 3½ inches or 4 inches thick, so long as the humidity is less than 75 per cent.

The actual saving in fuel arising from the presence of one or another roof upon the building may be shown in the following manner: Let us assume that a building has a roof area of 200,000 square feet, that it is so situated that the average outdoor temperature for the four winter months is 32 degrees F., that the average temperature inside is 62 degrees F., that coal costs $6 per ton, and that the loss in the boiler plant is 30 per cent. The construction of the slab is similar to the slab *A*.

Then the heat loss through it for four months will be

$$200{,}000 \times 30 \times 4.08 \times 4 \times 30 = 2{,}938{,}000{,}000 \text{ B. t. u.}$$

A similar roof of Asbestos Protected Metal would transmit in the same time

$$200{,}000 \times 30 \times 23.7 \times 4 \times 30 = 17{,}064{,}000{,}000 \text{ B. t. u.}$$

The difference, 14,126,000,000, will be the saving in British thermal units.

If we assume that the heating value of the coal is 14,000, then the amount of heat available in the heating plant for $1.00 is

$$\frac{14{,}000 \times .70 \times 2{,}000}{6.00} = 3{,}267{,}000 \text{ B. t. u.}$$

Hence the saving in fuel arising from the substitution of one roof for the other would be

$$\frac{14{,}126{,}000{,}000}{3{,}267{,}000} = \$4{,}324$$

for the four months, under the assumed conditions. Of course it must be borne in mind that the fuel cost is not the only item in which saving would occur, but it is not deemed within the province of this report to discuss the other items in detail.

It is believed that the figures given and the examples outlined show conclusively the very great effectiveness of the Metropolitan Gypsum Composition roof slabs in preventing loss of heat and in greatly diminishing the liability to condensation existing in roofs of less insulating value.

## Structural Engineers in California

IF a proposed new law designed to govern the practice of architecture, which has recently been proposed in California, should be enacted, says the *Heating and Ventilating Magazine*, it would look as if the ranks of the heating and ventilating engineers in that State would be swelled by a body of men to be known as "structural engineers." The proposed law, which has been introduced in the State Legislature as Assembly Bill No 1126, starts out by providing that plans for all new buildings, except residence, and all alteration work which affects the strength and safety of the buildings, must be prepared by a person holding a certificate from the State Board of Architecture, and further provides that this board shall grant two kinds of certificates, one to "design and superintend the erection of buildings," and the other as "architect." Applicants must undergo examinations in order to procure either kind of certificate.

An applicant for a certificate "to design and superintend the construction of buildings" shall be examined as to (a) his practical experience, technical knowledge of materials, their strength and use in practical construction, his ability to compute mathematically the strength and stresses in materials and structures, and ability to design a building or structure so as to insure inherent stability and strength in all its parts and to meet the contingencies and problems of construction and public safety that arise in the erection of buildings; (b) theoretical and practical knowledge of sanitation as applied to buildings, and his ability to design plumbing systems; (c) knowledge of the theory and design of heating and ventilating systems, and his practical understanding of the various systems in use; (d) his knowledge of stereotomy; (e) his knowledge of specification work; (f) his general education and knowledge of architectural terms, together with his character and fitness for a certificate.

The holder of either certificate will be entitled to prepare plans and superintend the erection of buildings of every kind. Persons securing a certificate as "architect" will be entitled to use the word "architect" as designating their profession and to advertise as such, but it is made unlawful for any one else to use the word "architect" or any derivation in any way which might result in designating such person as an architect. Persons holding a certificate "to design and superintend the erection of buildings" will be entitled to use the words "structural engineer" to designate their profession.

The proposed law further provides that it shall be unlawful to construct, erect, alter, add to, repair or reconstruct any building, if the work affects the strength and safety of the building except residences, unless plans for the work are prepared by and the work done under the supervision of a person holding a certificate "to design and superintend the erection of buildings" or as "architect."

## Largest Grain Elevator in America

WHEN completed, the grain elevator now in course of construction for the Chicago and Northwestern Railway in Chicago, will be the largest and most complete structure of its kind not only in America but in the world. The properties will consist of a working house, storage bins, receiver house, track shed, drier equipment, bleacher outfit, marine tower, shipping gallery, dusthouse, powerhouse, shop, office and welfare buildings. Reinforced concrete was used mainly in the construction. The properties, when finished, will have cost over $3,500,000.

## *Proper Electrical Inspections*

PROPERTY-OWNERS of Newark, N. J., and the territory adjacent thereto, are urged by the Fire Insurance Society of the city to give very careful heed to the electrical lighting and heating equipment in all buildings, the poor installation of which is a frequent cause of severe fires.

The letter of the underwriting organization dealing with the question reads:

"Understanding that you are considering having your property equipped for the use of electricity, we take the liberty of advising that the use of electrical energy is one of the safest means of producing either light, heat or power when introduced according to the rules of the National Electric Code. This code is recognized by electrical experts and insurance companies as the highest practical authority on electrical installations.

"Electricity not so introduced constitutes a serious fire menace to life and property. None but the most approved material and devices should be used, and installations should be made only by responsible and competent electricians.

"Experience has shown, however, that all electrical work, new or old, should be inspected. This is generally recognized in New Jersey.

### Fire Underwriters Vitally Interested

"Fire insurance companies are vitally interested in this matter, because it usually falls on them to pay the fire losses occurring from defective electrical installations, but the property-owner and public are equally interested because the ultimate burden of fire waste must eventually fall upon them. For years the companies have been making inspections to minimize the fire hazards of electricity, and are, therefore, better qualified and equipped to continue making unbiased inspections than any other body.

"We urge you to safeguard your interest by requiring your architect or electrician to include in the contract a clause expressly agreeing that on completion of the electrical work you shall be furnished with an underwriters' certificate of approval of the entire electrical installation.

"Your attention is invited to the fact that this office maintains a highly efficient corps of specially trained and reliable electricians for making thorough electrical inspections, for which a small fee is charged to cover the cost of service and the issuance of an underwriters' certificate of approval of the installation."

The Fire Insurance Society has been of very great aid to proper building practices in Newark, and has been no small factor in reducing the fire hazard of the the community. Its officers are alert and are prompt to recognize new dangers as they develop. Their efforts should have the cordial support of property owners.

## *Dayton Issues New Code*

ALL building operations at Dayton, Ohio, are now being carried on in conformity with the provisions of the recently adopted Building Code, the enforcement of which has been entrusted to the chief building inspector.

While the code has been carefully prepared, the city's administration recognizes that in a work of such magnitude "it is inevitable that certain errors and inconsistencies occur," and wherever these happen, it is urged that they be brought to the attention of the chief inspector.

Under various sections of the code provision is made for the use of fire safety devices, as follows:

### Standard Fire Doors

"Where standard fire walls, or standard fireproof walls, ceilings and floors divide a single building into two or more different classes of occupancy, or party walls are used between two different buildings, all communicating openings in such walls shall be covered by double standard fire doors, using either automatic standard fire doors, or standard rolling steel doors on one side of the wall, and standard self-closing fire doors on the other side of the wall. Where standard fireproof walls, ceilings and floors are prescribed under the various classifications of Part 2, and are used to subdivide a building of one class of occupancy into smaller areas or are used for enclosing elevators, stairways or heater rooms, all communicating openings shall be covered by single standard fire doors, and unless otherwise prescribed under the various classifications of Part 2, these doors shall be standard self-closing fire doors."

Standard rolling steel doors and shutters, and standard fireproof windows and all hardware, sills and other equipment used in connection therewith, shall be constructed and erected in accordance with the requirements of the Building Code of the State of Ohio.

Use of combustible roof coverings is prohibited upon any permanent structure within the fire limits.

For the purpose of the code an "Incombustible Roof Covering" shall be tin, iron, slate, tile, cement, asbestos shingles or other similar fire-resisting material or a composition covering of not less than three thickness of roofing felt, each weighing not less than 14 pounds to the square (100 square feet), all cemented together and covered with a good coat of pitch solidly mopped and finished with a gravel top."

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LARGELY through the activity of the Asheville Board of Trade, new buildings to the value of over $1,095,000 were erected at Ashville, N. C., during 1916—an increase of over $400,000 beyond the previous year's results.

# Avoiding Accidents Due to Falls in Building Work

ALTHOUGH many more people are employed in factories than engaged in building construction work, it is surprising to note that in almost every State of the Union more fatalities due to accidents occur in building work than in factories.

In view of this fact, and because of the excellent suggestions offered, CONSTRVCTION publishes herewith an article which is the result of investigation by the Bureau of Statistics and Information of the Department of New York State.

Without going into the details of legal requirements in regard to safety of life and limb in the work of building construction, we must realize that consideration for the welfare of employees, and the possibility of reducing economic loss from accidents made definite and specific by compensation laws in many states, both weigh with employers to take measures voluntarily for prevention of accidents. It is to emphasize the seriousness of the particular hazard here considered and to suggest means of prevention for it in general that is the aim here. Accordingly, in the following pages are summarized, from such sources as were at hand, measures recommended by experts which are calculated to prevent injury to workmen by falls in building work. There is every reason to believe that use of measures such as these would prevent a very large proportion of the startling number of fatal accidents due to falls in building work which are now occurring.

### Scaffolds

A recent publication by the Travelers' Insurance Company on "Safety Engineering Applied to Scaffolds" gives a complete description of the various kinds of scaffolds and the methods of insuring safety to the men working upon and around them. This is the first comprehensive study of American experience in scaffold construction from the standpoint of safety. Most of the following recommendations are based upon the descriptions contained in this treatise.

Scaffolds are roughly grouped into three main classes—pole, suspended and outrigger. Pole or fixed scaffolds are most common. In these the weight is supported by poles or uprights which remain in place until the wall is completed. The bricklayers' pole scaffold utilizes the wall itself for supporting the inner edge of the working platform, and hence requires but one row of poles or uprights. Pole scaffolds are used almost exclusively in constructing buildings not over five stories in height and higher ones that have no framework of structural steel.

In the construction of high buildings with steel framework swinging or suspended scaffolds are used. Such a scaffold consists of a platform swung by steel cables from the upper part of the steel framework of the building in such a manner that it can be conveniently raised and lowered.

Outrigger scaffolds consist of platforms supported upon beams which extend out through windows or other openings in the walls and which are secured to the framework or flooring within the building. Outrigger scaffolds are not recommended when some other kind can be used.

### Pole Scaffolds

Poles or uprights should be straight, straight-grained and free from bad knots and other imperfections. They should be set as nearly vertical as possible, to insure stability of the scaffold. They should be set as near the wall as possible. The standard distance from the wall to the poles in a bricklayers' scaffold is 4′ 6″. Poles should not be spaced farther apart than 7′ 6″ from center to center. They should be fixed at their lower ends to prevent displacement.

Cleats for splicing poles should be not less than 1¼″ thick and should be wider than the poles. They should overlap each pole not less than 2′. There should be two cleats to every joint or splice, and these should be on adjacent and not on opposite sides of the poles. Wherever possible, the practice should be followed of breaking joints when splicing poles.

Ledgers should be fastened to the inside of the pole. This shortens the span for the putlogs. The vertical distance between ledgers should not exceed 5′ 2″. Each ledger should be fastened to each pole with 5 first-class cut nails of large size, preferably 10-penny. Wire nails should never be used for this purpose.

Putlogs should be close grained, sound and free from knots. There should be at least three putlogs to every plank—one at each end and one in the middle. They should rest on the ledgers as close to the poles as possible.

Planks should be carefully selected, straight-grained, sound and free from bad knots or other defects. The standard size is 2″ x 9″ x 16′. When such planks are used they should be laid 5 wide. The space between the outer poles and the wall should be filled in as nearly as possible to prevent the falling of men or materials. If the scaffold is properly built there is no necessity for fastening the planks to the putlogs, since the weight of the planks and the load they carry is sufficient to prevent their displacement. Planks should not abut on the same putlog.

Pole scaffolds should be braced not only to insure stiffness to the scaffold itself, but also to prevent the scaffold as a whole from falling away from the building. The poles should also be supported by longitudinal bracing to prevent the scaffold from collapsing parallel to the wall. All braces should be of adequate size and of suitable material.

A guard-rail should be constructed for pole scaffolds, so placed that the height from the platform to the upper edge of the rail is 40". These rails should be at least 6" x 1", and should be securely nailed to the side of the poles facing the platform. Two guard-rails, the upper one 40" high, are preferable to one.

A foot-board should project above the platform at least 7". It should make a tight joint with the platform in order to prevent materials from falling.

Wherever possible a netting of stout wire, having meshes not greater than ½", should be used along the outer edge of the scaffold platform. This netting should extend from the guard-rail to the foot-board, and should be securely fastened to both.

### Suspended Scaffolds

The use of swinging or suspended scaffolds is limited, in new work, to buildings with steel or concrete skeletons. When properly constructed such scaffolds are the most economical and the safest for use on high buildings. The flexibility of suspended sccaffolds is an asset in the construction of modern high buildings.

The attachment and care of cables should be in charge of men who are skilled in such work. It is quite common for builders to lease scaffolds instead of owning them. In such cases the erectors and caretakers of the scaffolds are men skilled in such work.

The platform should be tight enough to prevent the smallest tool from dropping through. It should hang close enough to the building to prevent men from falling through between the platform and the wall. Planks are usually 2" x 9" x 12' or 14'. They should overlap at least 1'; an overlap of 2' is preferable. Workmen should never be permitted to drop objects upon the platform, as this practice strains the scaffold much more than does the weight of the objects alone.

Suspended scaffolds should be equipped with hand-rails, the upper one, if two are used, being 40" high. It should be securely fastened and strong enough to resist the shock caused by a large man falling heavily against it. Rope is inferior to wood for guard-rails.

A foot-board, extending at least 7" above the platform, should be placed around the platform, inside of the cables. It should fit snugly to the platform at all points to prevent materials from falling through.

A side screen, consisting of stout wire with not over ½" mesh, should be used on the outside and across the ends of platforms. It should be attached to both guard-rail and foot-board.

Because of the presence of workmen above those who work on suspended scaffolds, creating a hazard from falling rivets, bolts, hand tools, etc., such scaffolds should be equipped with protecting covers. Canvas shields placed 3' to 6' above the heads of the workmen are sometimes used for this purpose. Planks or wire mesh are also used. Canvas is most expensive and generally least satisfactory. Wire mesh is perhaps most satisfactory. It permits the free passage of light, weighs less than plank and is not seriously disturbed (as is canvas) by high winds. Where wire is used the mesh should not be over ½".

Life lines and safety belts for men who go out on thrust-outs to attach or adjust swinging scaffold machines are common in Europe, but are seldom seen in this country.

### Outrigger Scaffolds

As already noted, outrigger scaffolds are not recommended where some other form can be used. Where they are used to support workmen and materials they should be reinforced by external struts and braces wherever possible.

Sometimes the height of an outrigger scaffold is increased by building a horse scaffold upon it. Such practice is to be avoided if possible. But wherever outrigger scaffolds alone or outrigger and horse scaffolds are used, they should be equipped with guard-rails, foot-boards and side screens.

Outrigger scaffolds are suitable for use as protective roofs over suspended scaffolds and as catch platforms. It is desirable to have auxiliary platforms at suitable places to arrest the fall of objects from suspended scaffolds or other parts of the building where material is apt to fall. Especially should doorways and passageways be protected by catch platforms when men are working above.

### Bracket Scaffolds

It is not sufficient for the bolts in the brackets of a carpenter's scaffold to extend through the outer sheathing of the building olny. They should pass through a board placed across the inside of two vertical studs as well.

In laying the platform of carpenters' scaffolds care should be taken to avoid "traps." This can be done by having a sufficient number of brackets so that the boards of the platform will not overlap between brackets. At any rate it is desirable to have enough brackets to prevent the platform from sagging. If necessary two layers of boards should be used instead of one.

Guard rails are seldom found on carpenters' scaffolds, though they can be and should be used. Foot-boards are also recommended, and in some cases side screens, though the latter are not always essential.

*(To be concluded next month.)*

# *Gypsum in Building Construction*

AS an aid in building construction, gypsum is attaining an ever-growing popularity, use of the product in such connection being many times greater to-day than it was some years ago.

The Federal Government reports that nearly half a million tons of uncalcined gypsum is sold annually, "the bulk of it being used for retarder in Portland cement."

### Has High Fire-Resistant Power

"Calcined gypsum," to quote from the Government's latest report, "amounting to about a million and a half tons annually is used as wall plaster. This use and the qualities of the plaster, such as hardness, quick set, fire resistance and poor conductivity of heat and cold, are so well known that further discussion will not be given here.

"The making of gypsum board, tile and screed is the newest branch of the industry and has not yet attained any considerable proportions; at least, the total value of the annual production of this material is probably less than $200,000. The statistical cards sent out by the Geological Survey do no ask specifically for reports on these products. Nevertheless, the reports for 1915 show that they were made at twelve plants in that year.

"Gypsum plaster boards are of various types, mainly consisting of gypsum mixed with fibrous binding material to give strength and toughness for effective nailing. A type of plaster board in common use consists of four alternate layers of wood felt, with three intermediate layers of gypsum. Other boards contain but two layers of felt, with a gypsum layer between. In order to meet the joint and stud facing of standard construction, plaster boards are usually 32 by 36 inches (8 square feet) and are made one-fourth, three-eighths and one-half inch in thickness. The wool felt binding material forming the outside surface of the plaster boards is an excellent bonding surface for gypsum plaster. Plaster boards are used for lathing in place of wood or metal lath on surfaces that are to be plastered, and where high fire-resistive construction is required. In fireproof construction the plaster boards are fastened to metal studs or hangers by metal clips. On surfaces not to be plastered plaster boards are used for deadening sound by being laid between rough and finished floors ;as sheathing boards by being nailed to the studding and behind the clapboards; as outside stucco covering; as insulation and fire resistance under wood shingles, in air ducts and in dumbwaiter shafts.

### Partitions, Floors, Roofs and Furring

"Gypsum floor screeds are used as a nailing sleeper for floors. They are 2 by 3 inches and 8 feet long and weigh 2 pounds per linear foot. They do not rot or burn.

### Partitions, Floors, Roofs and Furring

"Gypsum tile is made for partitions, floors, roofs and furring. Partition tile, solid or hollow, is 12 by 30 inches wide and 2 to 8 inches thick. These tiles, laid with gypsum plaster, are used in the highest type of fireproof building for dividing and corridor partitions, in elevator and stairway inclosures and in dumbwaiter shafts; they are light in weight, can be laid very rapidly, can be cut with a handsaw, and when plastered with gypsum make partitions of high heat-resistive value.

"Gypsum floor tile is a hollow box or dome of reinforced gypsum plaster, used as a filler between concrete joist construction. These tiles are 19 inches wide and 24 inches lon, 7, 9, 11 and 13 inches high, and weigh 24, 27, 30 and 33 pounds per linear foot; they afford a saving in dead weight of construction and provide a smooth, all-gypsum ceiling to plaster upon.

"Gypsum roof tile is made 24 and 30 inches long, 12 inches wide and 3 inches thick, and is laid between supporting subpurlin 'T' irons. Larger gypsum roof tile, reinforced and made of especially hard gypsum, are made to span 4 feet and are laid upon the main roof purlins. These tile are 4½ inches thick, 18 inches wide, and of biscuit pattern. All these roof tiles weigh 13 pounds per square foot and are light and noncondensing. The low heat conductivity of gypsum is an especially valuable quality in a roof deck. Slate or any other roof covering can be nailed or otherwise secured to the smooth decks of gypsum roof tile.

"Gypsum furring tile are of the same character and general dimensions as the partition tile, are hollow or solid, and are 2 inches thick. They are fastened to the wall by nailing and are used for sound absorption and soundproofing, fire protection, insulation from heat or cold and damp proofing.

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IN Twin Brooks last month a defective flue cost $21,750.

$8,500 to the owner and $13,200 to his neighbors.

I wonder if that owner didn't think, well, that flue will hold all right until warm weather, I can fix it up then. Probably his neighbors thought the same way. I bet they have changed their mind.

Those neighbors as every other neighbor should have been on the job and in some way fixed that flue up. There are plenty of ways to do it without getting your clothes dirty.

The owner has the consolation, that if he wants to build a new one he won't have to go to all of the expense and trouble of taking the old one out.—South Dakota State Fire Marshal.

# New Literature in the Field of Building Con

*Reviews of Books, Catalogs and Other Literature Which Should Be*

## *"Frightful Fire Losses"*

CAPTIONED as above the Merchant & Evans Company, of Philadelphia, is circulating a folder quoting the figures of the National Board of Fire Underwriters regarding the fire loss of the country for 1915, classified as follows:

Strictly preventable fires, $32,720,239; partly preventable fires, $58,148,339; due to unknown causes, but assumed to be largely preventable, $62,363,298.

Properly enough the Merchant & Evans Company concludes that the enforced substitution of an incombustible roof for the dangerous wooden shingles so freely used for no other reason than that of long-established habit, would speedily result in a marked saving in the national fire loss.

Upon the fourth page of the interesting leaflet is a reprint of an arraignment of the wooden shingle, written by Robert G. Gebler and first published in the April, 1916, issue of CONSTRUCTION.

## *"Wire Glass and Why"*

BUILDERS and property owners not fully acquainted with the merits of wire glass and the many uses to which it may be put in construction work will do well to call upon the Pennsylvania Wire Glass Company, of Philadelphia and New York, for a copy of its well-prepared booklet, entitled "Wire Glass and Why."

Among other virtues claimed for wire glass, the possession of which has been proven through the years, are the following:

"It is fire retardant, a safeguard to human life, an important factor in building economy and an important factor in reducing insurance rates."

### Where Used

"Wire Glass is installed in automobiles, trolley cars, railroad coaches, stages, vans, locomotives; also steamships and war vessels. It is found in every conceivable form of building, including hotels, homes, apartments, theatres, schools, churches, clubs, prisons, reformatories, sanitariums, banks, post offices, libraries, colleges, gymnasiums, garages, telephone, telegraph, express, transfer, and railroad stations; municipal, state and government buildings; mills, factories, canneries, breweries, distilleries, warehouses; and in roof openings, elevators and stairway exclosures; galleries and bridges; pavilions and booths; platforms and shelters; docks and piers; vaults and safes. In every instance it is giving perfect satisfaction to its users.

## *Imperial Cincinnatus Batch Mixers*

THROUGH the medium of a clearly printed and unusually well-illustrated catalogue the Ideal Concrete Machinery Company, of Cincinnati, Ohio, presents to the engineering and contracting fraternity the merits of Ideal Cincinnatus Batch Mixers. Profiting by twelve years' manufacturing experience the company is now offering a product behind which it is willing to place its excellent reputation.

The construction of its mixer is thus outlined by the Ideal management:

"Mixing blades and cups are mounted on forged steel brackets, which are bolted to the drum with a double washer under the head of the bolt on the outside and rivited over the nut on the inside. This construction keeps the blades and cups securely in place.

"Catch wings are riveted to inner end of discharge chute, which catch a large amount of mixed concrete and greatly facilitate rapid discharge.

"The discharge end drum head has a slop ring as a part of the casting or drum head, which prevents slopping. A steel apron is fastened to the lower inner end of the discharge chute to prevent splashing.

"The blades come in from both sides towards the center, forcing the cement and aggregate together; the dumping buckets pick up a portion of the mass and carry it to the top and then drop it to the bottom again; this tumbling action combined with the kneading action of the blades accomplishes an exceedingly fast and thorough mix; this action assures the thorough mixing of concrete of all consistencies.

"In building the Ideal Cincinnatus Mixers, we eliminated to an entirety everything that might be considered as complicating parts. We claim for our mixers the very acme of simplicity.

"Starting with the trucks and steel frame, we built on straight lines of serviceable simplicity; we avoided all useless parts of every kind, and we claim this not only reduces possible breakage, but it makes the machine easy to handle by even inexperienced operators and reduces the labor to a minimum.

"The mixers we manufacture are arranged to occupy the smallest possible space; this elimination of

## struction, Fire Prevention and Protection

*in the Files of Every Architect, Contractor and Prospective Builder*

length and width of the chassis is appreciated when mixers are to be used in contracted areas.

"We encase the trunnion shafts with pipe spacers, which serve to keep the trunnions in exact alignment and absolutely prevent any possible slipping lengthwise on the shaft. This method makes it unnecessary to weaken the trunnion shafts by cutting keyways in them.

"Steel housing is a practical necessity to every mixer as a protection to the power equipment. One of the past sources of trouble has been the hinged door of the steel housing; it made no difference how big or heavy a hinge was used, the weight of the steel door; its continual use in opening and shutting; winds flapping it back and forth; soon caused either the door to loosen from the hinges or the hinges to break from the door. To take care of this annoyance to the contractor, we produced a removable section, which is kept in place by locks; this door when removed leaves the entire front and a small section of one side open for easy access to the engine parts that require attention.

"The housing is quite large, covering not only the engine, but the clutch and countershaft as well, and leaves sufficient space for the storage of wrenches, spanners, and other small tools.

"The trunnion shafts revolve in flexibly hung roller bearings. This is an exclusive Ideal Cincinnatus feature. The flexibly hung bearings prevent binding that might result from springing or twisting of the mixer frame, due to uneven ground. It makes the drum easily turned, lightens the load on the engine, reduces wear and prolongs the life of the entire equipment. These bearings are thoroughly protected by steel dust caps from damage by grit, cement and water.

"The power loading skips are built for quick loading with either shovel or wheelbarrow; the end wall is built at an angle of about seventy degrees, greatly facilitating the discharge of the wheelbarrow into the skip.

"We equip our mixers with water tanks of the open type with float arrangement; we adopt this type because they are the simplest and give no trouble. We give the buyer a choice, however, of the open or closed type of water tank.

"The water valves on our automatic measuring tanks are absolutely water-tight and can be kept so, as they permit of regrinding.

"These are one-piece, semi-steel castings, machined for running track of the trunnions, making a smooth running equipment.

"Our engineering department has made a study of the vibrating effects of gas-engine equipments, and we have adopted the vertical type engines in our three larger sizes because our experiments proved that the pounding of the reciprocating parts of the horizontal engines caused severe vibration of the entire mixer frame, whereas the piston thrust in vertical engines is downward directly over the wheels of the mixer, reducing vibration to a minimum.

"Our mixers are equipped with either of the following high-grade gas engines: Novo, Ideal, or New-Way.

"The drum is supported and revolves on four trunnions having chilled faces.

"Our drive is through a one-piece semi-steel sprocket."

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A summary of the address delivered a short time ago by Byron Cheves Collier before the Toronto Branch of the Canadian Society of Civil Engineers has been printed and circulated by the Cement Gun Company, Inc., of Allentown, Pa.

The author tells of the discovery of the Cement-Gun and the numerous and admirable ways in which it can be used in construction work. The text is freely illustrated.

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The Reichert method of monolithic concrete construction is clearly and tersely set forth in the latest folder of the Reichert Manufacturing Company, of Milwaukee, Wis.

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Two folders describing the various tools manufactured by the A. A. Wood & Sons' Company, of Atlanta, Ga., have been issued, and will be promptly supplied to all interested, upon request.

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Details concerning the design and construction of the Durable Duplex pumps, manufactured by the Dean Brothers Steam Pump Works, of Indianapolis, Ind., are given in circular No. 104, newly issued by the corporation.

**SAFEGUARD YOUR ELEVATOR SHAFT!**

Statistics show that fires spread through the media of air shafts, dumbwaiter shafts and ELEVATOR SHAFTS. For your freight elevator shaft openings, specify the

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and feel secure. Approved by National Board of Fire Underwriters and all Boards having jurisdiction.

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# *For Greater Fire Safety at Detroit*

CHANGES in the building regulations of Detroit, Mich., that will make for greater security from fire in the city, as well as add to the general comfort of its people, are under consideration by the Building Commission. Once its decisions have been reached, the matter will go before the City Council for further review, and, it is confidently believed, will be confirmed by the law-making body.

It is proposed to designate a "congested district," in which all buildings to be erected must be of fireproof construction, or "Type 1," under the building code, and in which all present buildings of four stories or more must be equipped with automatic sprinkler systems.

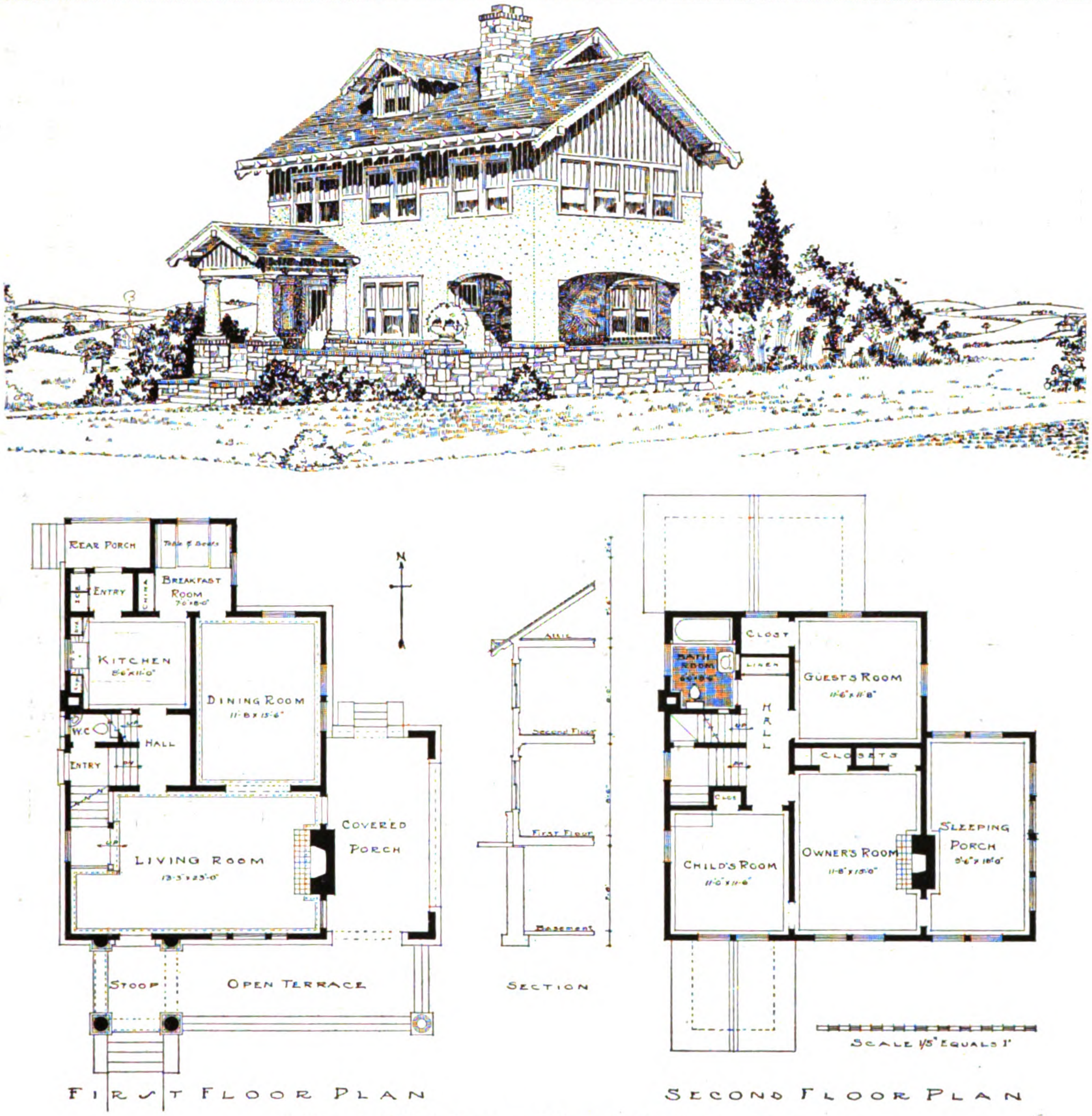
The sprinkler system suggestion was referred by the Building Commission to the Code Revision Commission, which is now overhauling the entire building regulations of the city.

Following a recent inspection of Detroit, the engineers of the National Board of Fire Underwriters had the following to say concerning the general fire hazard of the city:

"The congested value district is divided into several sections by wide streets and open spaces, forming fire breaks, which should be effective, except under adverse conditions. The increased amount of fireproof construction and sprinkler protection has somewhat reduced the potential hazard, which, however, is still high in spots. While fires should be controlled and prevented from spreading beyond the section in which they originate, owing to the good fire-fighting facilities and the aforesaid fire-breaks, the frequency in some sections of conflagration breeders with surroundings lacking in fire-resistive features, and some narrow streets, creates a serious probability of spreading fires; such conditions are most marked in the sections lying south of Congress street. In minor mercantile districts severe individual to group fires may occur, but the probability of sweeping fires is small. Except in a few instances, where there is congestion, fires in manufacturing districts should be confined to the individual plants. Residential districts consist mainly of shingled roof, frame dwellings, with the hazard of flying brands increased to a pronounced degree by congestion and high winds." The suggested changes are endorsed by local architects, engineers and underwriters, and by property-owners alive to the city's needs.

# SAFE HOMES

*Edited by* **RALPH P. STODDARD, Secretary**
**Society Advocating Fire Elimination**

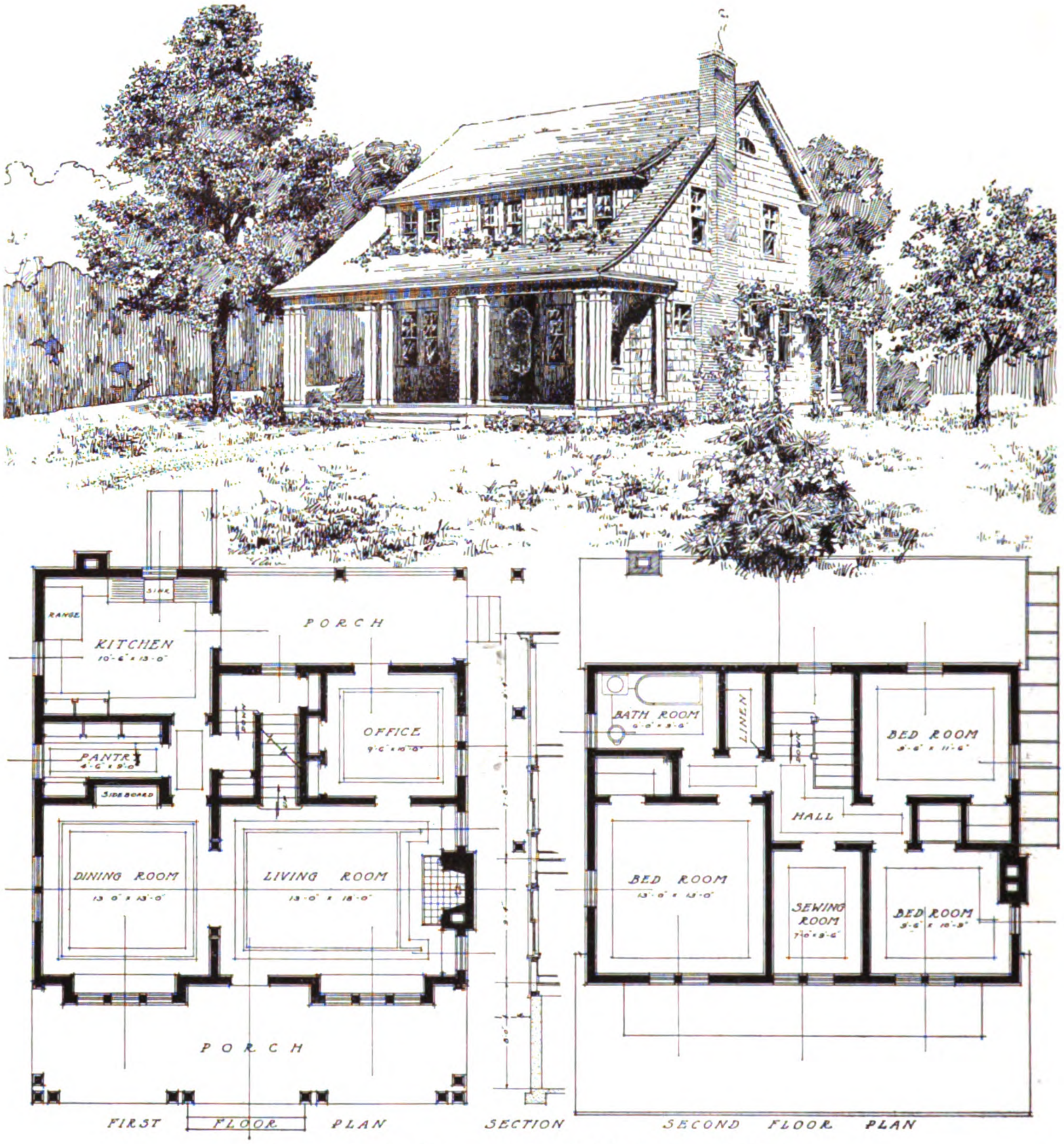


A Type in Which Stucco and Firesafe Shingles Are Used

*Designed by Geo. F. Green, Kansas City, Mo., and Built for* $5,455.37

THE interesting feature of this design is the imposing appearance resulting from the addition to the main body of the house in the form of a large enclosed porch with sleeping room above. This addition is incorporated in the general construction in an attractive manner and one which adds to the size and appearance of the house.

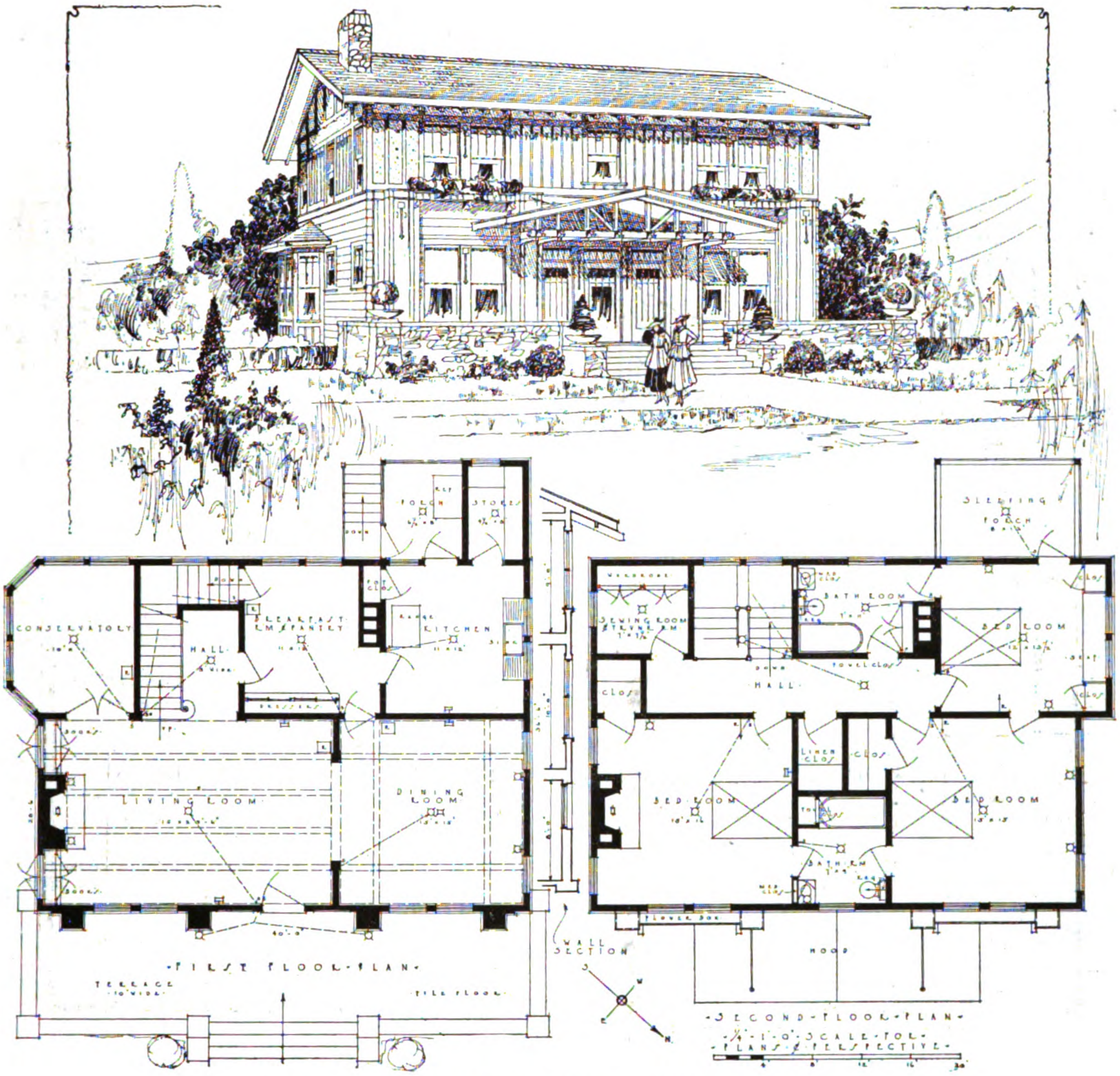
Another interesting point is the breakfast room—small and attractive. Particular attention is directed to the installation of table and seats close to the window. The house is well lighted, having square, sensible rooms; and fireplace is provided on the exterior by the use of unburnable roofing and wall construction materials.



A Suggestion for Cement Block and Asbestos Cement Shingles

*Designed by Wm. H. Smith, New York City. Built in Mattituck, L. I., at a Cost of* $4,800

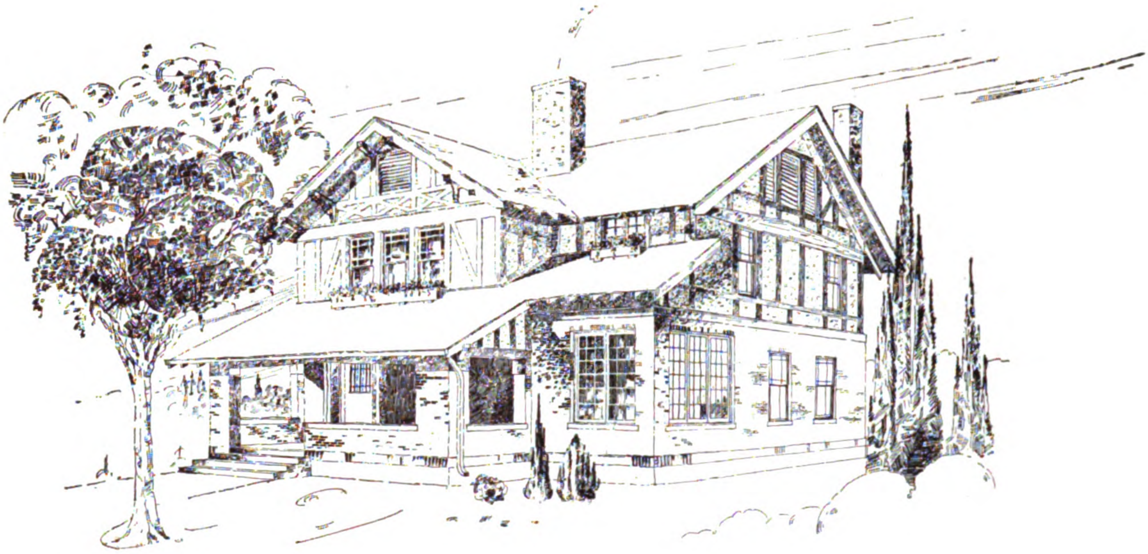
A NEAT and attractive design in which the use of cement blocks and fire-resistive shingles is suggested as a means of making the exterior safe against fire. The second floor is broken through the roof slope in a pleasing manner, providing light on all sides for the bedrooms. A unique feature is the provision of an office on the first floor for the convenience of the owner. The door from the spacious front porch opens directly into a cheerful living room, where an open fireplace adds to the hospitality of reception and entertaining. The dining room is well lighted and provided with a built-in sideboard. One large and two smaller bedrooms are provided on the second floor, as well as a sewing room and conveniently arranged bathroom.

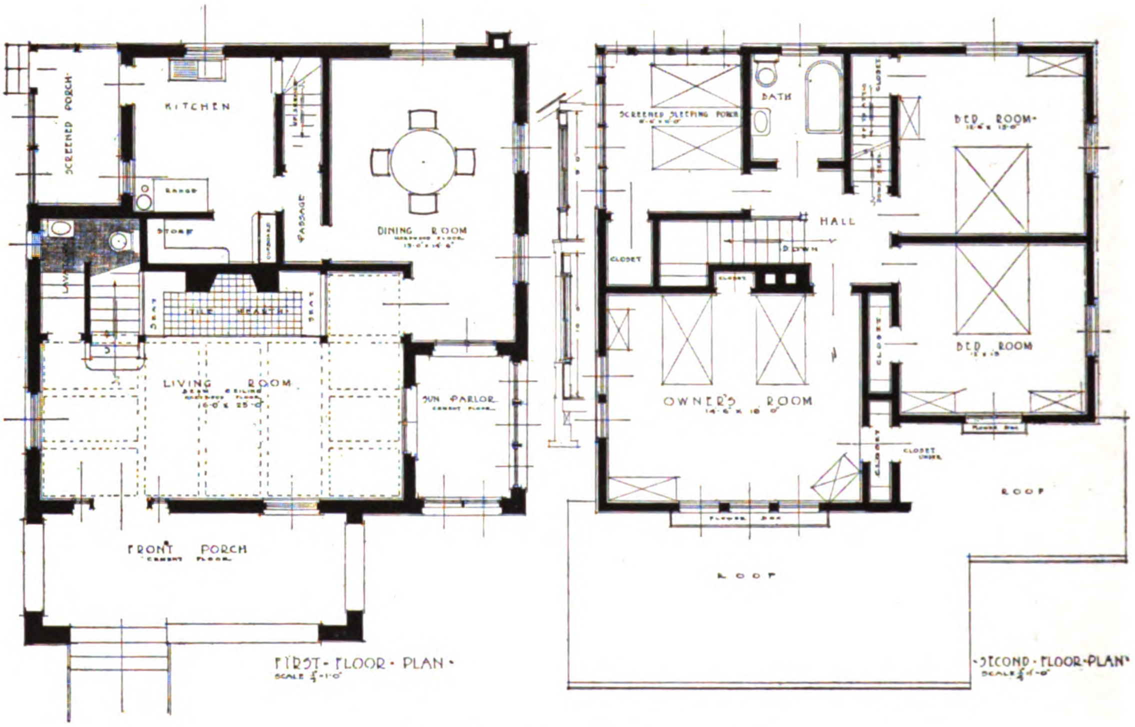


**Frame and Stucco Exterior With Unburnable Shingled Roof**

*Designed by Clifford Evans, Birmingham, Ala., and Built in that City at Cost of* $5,475

THE design shown herewith is well worth careful attention and study. This house might well be termed of Americanized Spanish style. On the exterior the use of narrow vertical panels of stucco with widely extended, slightly sloped roof planes provides a sense of spaciousness and comfort. Wide stairs lead up to the terrace level, which in itself is similar to a spacious porch and may be provided with tiled floor. The entrance is immediately into a large living room, having open fireplace and beamed ceiling and opening into the dining room through a wide arch. Off the living room is an attractive conservatory, entered through wide swinging doors. Spacious bedrooms, bathroom and sewing room are provided on the second floor, together with a sleeping porch. Ample closet room is provided, the house is well lighted and arranged for comfort and convenience.





**Attractive Combination of Brick and Stucco**

*Designed by John P. Almand, Little Rock, Ark., and Built for* $3,410.39

FACE brick and stucco panels, with a roof broken into pleasing lines by the use of gently sloping planes, together with well-studied window arrangements, have resulted in a most pleasing design and a house built at low cost. Living room is large, having beamed ceiling and panelled walls, open fireplace and tiled hearth. The sun parlor with cement floor offers an additional attraction. The second floor is provided with two good-sized bedrooms and a large owner's room. Closet room is ample and screened sleeping porch offers comfort in summertime.

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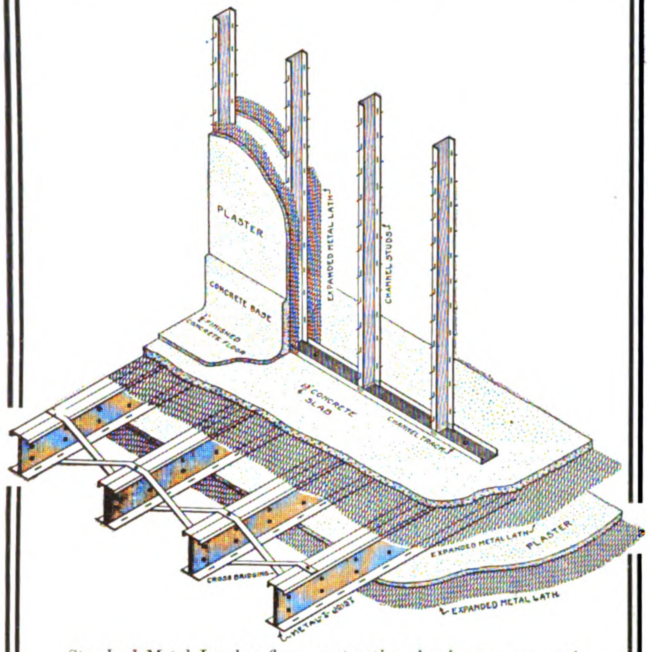
**STRENGTH REPUTATION SERVICE**

## A Fireproof Construction



Standard Metal Lumber floor construction showing non-supporting channel stud partitions resting on rough concrete slab. Finished floor and base to be concrete. Berger's Expanded Metal Lath attached to top and bottom of I-Joists.

BERGER'S

## Metal Lumber

(Patented)

## and Expanded Metal Lath

THIS fireproof construction is fast replacing other construction materials on account of its safety, strength, durability, ease of installation and moderate cost. It forms a structure that is practically a unit and perfectly rigid, even before concrete or plaster is applied.

Berger's Metal Lumber is punched with prongs on the flanges, to which Berger's Expanded Metal Lath is attached. The blow of a hammer bends the prongs over the lath, clinching it securely—no wiring being required.

Berger's Metal Lumber is made from a special analysis, heat-treated, double-grained steel. Official, practical fire, load and water tests have proven it to be fireproof and indestructible. Each unit is cut and numbered according to building plans, making erection easy and speedy.

Berger's Expanded Metal Lath provides a secure foundation to receive the mortar. The small diamond-shaped meshes insure a perfect "key", completely imbedding the lath in the plaster. Manufactured in sheets 8 feet long and 18 inches to 24 inches wide—gauges 22, 24, 25, 26 and 27.

Specify this combination for your buildings.

*Write for Metal Lumber Bulletin*
*12 C. and Metal Lath Booklet F. C.*

**The Berger Mfg. Co., Canton, Ohio.**

B BERGER

Branches: Boston New York Philadelphia
Chicago St. Louis Minneapolis San Francisco
Los Angeles

Export Dept.: Berger Bldg., New York City, U. S. A.

# JOHNS-MANVILLE

## Service to you—through Public Utilities

### Those who give you water, light, heat, travel and communication —use Johns-Manville Products

THOSE great public servants who bring you light, heat, telephone, telegraph and make transportation possible, live by serving. Remarkable as they are in size and scope, they are even more impressive for the sense of tireless diligence they convey.

When you press the switch at 2 A.M., the light must respond. You lift the telephone receiver today or next year—Central is always there. You expect water when you turn on the faucet. Thousands of trains move daily over the rails so that you may take just one—occasionally—any time. Have you ever figured out why this is so? Why it can be?

In organization these companies approach perfection. In mechanical equipment they choose only the best. Every material they use must be dependable and so must the concern from whom they buy.

They buy Johns-Manville products. Conduit for underground wires, Wrappings for cables, Electrical Protective Devices, Cements for boiler furnaces, Insulations for steam pipes, Lagging and Packing for locomotives, Roofs for their buildings, Insulations for steel cars, Linings for smoke stacks, and a hundred other products—all of Johns-Manville.

* * *

What better recommendation to you for the quality, safety and dependability of all things that carry the surname Johns-Manville? What better testimonial could there be of the value of Johns-Manville Service to you personally?

**H. W. JOHNS-MANVILLE CO.**
New York City
*Branches in 55 Large Cities*

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

**WEATHER:** Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

# The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

**LATEST EDITION**

Copyright by Construction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., April, 1917

**Priceless**

## KEPT PACE WITH COMPANY'S GROWTH

One of the most progressive and best known sheet metal producing concerns of the country is the Berger Manufacturing Company. Its plant at Canton, Ohio, covers 27 acres of ground and gives employment to hundreds of skilled mechanics, the result of whose labors find their way in ever increasing quantity to all quarters of the globe.

From a very modest beginning, the business of the Berger Company has grown steadily and satisfactorily, simply because of its management, appreciating that permanent success can only be attained through square dealing, insisted from the first that such policy be rigidly adhered to by everyone in the service of the company—from the chief executive down to the most youthful apprentice. In view of this fact, the prosperity of the Berger organization, while gratifying, is yet easy to understand.

Julius H. Schlafly, the general superintendent of the company, and a man who has contributed his full share to the upbuilding of its business, celebrated the thirtieth anniversary of his connection with the Berger interests on March 5, last. When he began his business career the factory of the company occupied a small building on Rex street. So restricted was the output of the concern in those days that Mr. Schlafly, aided by Ed. Langenbach, the present president of the Berger Manufacturing Company, had no difficulty in carting it over day by day to the freight station in a hand cart.

In those days the product consisted solely of eave trough hangers, eave troughs and conductor pipe. To-day, the company is understood to be shipping from 25 to 35 carloads of building specialties and steel office and factory ejuipment every twenty-four hours.

On March 5, the date of the anniversary, Mr. Schlafly's business and personal friends took occasion to remember him in different ways, and, as he expressed it, "My little celebration may not be of so much importance as that of other celebrations taking place at Washington, D. C., to-day, yet it means more to me. With all the encouragement and good words that I have received from my friends, I feel that my entrance upon my second thirty years of service is indeed propitious."

Julius H. Schlafly

CONSTRVCTION sincerely hopes that having entered upon the second lap of service with the Berger corporation, Mr. Schlafly may not only be spared to complete it, but also to have a further margin of time granted him thereafter in appreciation of his usefulness to the industrial world.

◆

As reorganized, the Oklahoma Portland Cement Company will in future be known as the Cement Securities Company, of Ada, Okla. The corporation controls a number of important cement plants of the Middle West.

◆

Having bought additional land, it is reported the Edwards Manufacturing Company, of Cincinnati, Ohio, extensive makers of sheet metal products, will soon enlarge its present factory.

## CLAIMS FOR TIN ROOFS

Advocating the use of tin roofs, the Metal Club, of Philadelphia, submits the following, among other reasons, why such form of covering should be adopted:

Absolutely Fireproof — Impossible to burn. Protection from flying sparks and acts as blanket to fire within.

Lighting Proof—Conducts electricity to the ground.

Low Insurance—Buildings with metal roofs receive lower rates.

Minimum Weight—Heavy rafters not necessary.

Sanitary—Cannot clog up eaves trough and conductor pipe. Sheds clean rain water.

Durable—Will last 25 to 75 years.

Minimum Cost of Maintenance—Leaks can be readily located and repaired at low cost.

Weatherproof—Can be subjected to all extremes of climate.

Low First Cost—Metal roofing is cheaper than competing materials of supposed equal value.

Salvage—Can be removed or reused or sold.

..Appearance—Presents a neat and clean appearance and can be painted in any color.

Adaptable—Can be used on roof of any size, shape or pitch.

Flexible—Provides for expansion and contraction, and it is not affected by settlement of building or seasoning of timbers.

Well Established—Metal Roofs have been used in all parts of the world for many years, and the above reasons are well established.

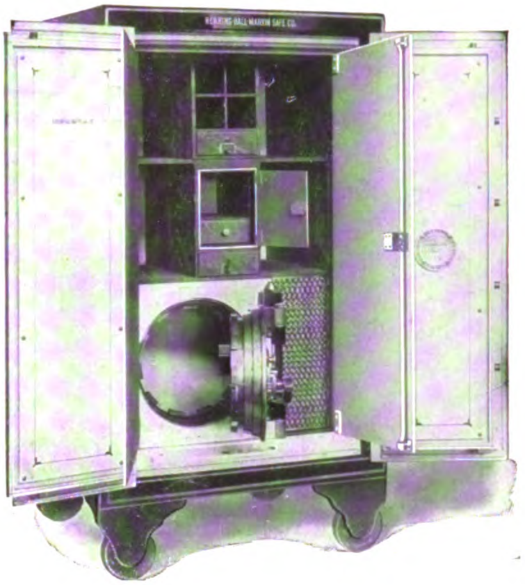
◆

## ESTABLISHES NEW RECORD

Within 34 working days, 640,000 square feet of slab were poured in constructing the addition to the Ford Motor Company's main factory at Detroit, Mich. This record-making feat was performed by the George A. Fuller Company, which had the general contract for the work.

# HERRING-HALL-MARVIN SAFE COMPANY

*Designers and Manufacturers of*



Fireproof and Burglarproof

## SAFES, VAULTS & SAFE DEPOSIT BOXES

For Offices, Residences, Banks and Bankers

***We offer the benefit of our experience of over seventy-five years in the manufacture of fire and theft-resisting safes and vaults and specially constructed Burglarproof equipments for Banks and Safe Deposit Companies.***

Plans and Specifications furnished without cost

| Executive Offices | Factories |
|---|---|
| 400 B'way, New York | Hamilton, Ohio |

Branches

*Boston, Mass.* *San Francisco, Cal.* *Chicago, Ill.*
*Birmingham, Ala.* *New York, N. Y.*

## FORCED TO INCREASE PRICE OF SLATE

For a number of years the cost of producing slate, the Association of Roofing Slate Manufacturers announces, has been steadily increasing. The price to the consumer, meantime, has remained practically stationary. The manufacturers consequently have been operating at a loss.

Already one-third of the quarries in Lehigh County and Northampton have been compelled to discontinue operations on this account, and the same fate looms up strongly for the others in this district, which produces 75 per cent of the dark blue slate quarried in the United States, unless steps are taken to prevent it.

The fact that something must be done if the industry were to progress has been apparent for some time, but the manufacturers have chosen to analyze the situation carefully before taking any action that would affect their patrons.

That analysis has shown but one way; that is to meet the prevailing conditions; namely, to advance the price of all grades of dark blue roofing slate.

Further price advances may be expected if production cannot be reduced.

The Association deems it right and proper to inform all who are interested in roofing slate that the advance is not due to greed on the part of the manufacturers, but an absolute necessity if they are to continue to be of service to the public in producing slate—Nature's roof.

◆

## PROTECTING RETAIL DEALERS

Appreciating the value of the retail dealer, who is in direct touch with the buying public, the Asphalt Shingle Publicity Bureau recently adopted the subjoined resolutions advising the trade thereof by circular letter.

Whereas, The Asphalt Shingle Publicity Bureau recognizes the fact that the retail dealer performs a distinct service in the distribution of the products manufactured by its members, therefore be it

Resolved, That the Asphalt Shingle Publicity Bureau takes this opportunity of recording its concordance with the policy of working through the usual channels of distribution, which are the jobber and the retail dealer; be it further

Resolved, That the Asphalt Shingle Publicity Bureau shall discourage, wherever possible, the soliciting of business from consumers direct.

Resolved, That the secretary be authorized to send copies of these rsolutions to lumber dealers' associations, hardware dealers' associations, building material dealers' associations and kindred bodies, who inquire of the Bureau as to the selling policy of its members.

◆

## TELLS ALL ABOUT MEDUSA CEMENT

Those interested in cement and the many uses to which it may be applied will do well to secure a copy of the catalogue just issued by the Sandusky Cement Company, of Cleveland, Ohio. The book conforms in size to that recognized by the American Institute of Architects, and contains 75 half-tone illustrations of work done in this country and abroad in which Medusa White had a prominent part.

It contains much information about stucco—colors, finishes, aggregates, etc.—and also covers other subjects for which Medusa White is particularly suitable—concrete blocks, bridges, floors, mantels, artificial marble, building trim, pergolas, garden furniture, ornamental cast stone, monuments, grave stones and concrete specialties. Tests, specifications and testimonials are also shown.

Architects, engineers and others connected with building construction may obtain a copy of the book by addressing the Sandusky Cement Company.

◆

*Long-Suffering Employer—Good gracious, girl, I sent you to get me fifty post-cards nearly an hour ago! What's kept you!*

*New "Office Girl" (war substitute)—Well, sir, I had to pick 'em out. I wasn't sure which you'd like best, so I got half actresses and half comics.*

◆

*"I trust we shall make you feel quite at home," remarked the hotel manager.*

*"Don't try it," expostulated the married man. "I'm away for a good time."*

## LIVES UP TO ITS PURPOSE

Under the management of J. W. Stinson, the Knickerbocker Portland Cement Company, of New York, has established a branch office at 45 Milk street, Boston, Mass.

For the benefit of building material dealers throughout the country who handle its product, the Knickerbocker Portland Cement Company, of New York, maintains what it terms its "Helpful Bureau." This department, as its name implies, aids dealers in expanding their business, whether such expansion directly or only indirectly advantages the cement company. The suggestions offered are thoroughly practical and inexpensive, and the testimony of those who have adopted them is that they produce the desired results.

◆

## INTRODUCING NEW BRICK PRODUCT

To acquaint the general public with the merits of "Tilebak," its latest product, the enterprising Barkwell-Farr Company, of Cleveland, Ohio, is conducting a newspaper prize contest in its home city. Keen interest is being taken in the matter, hundreds of replies having been received to the cleverly worked out advertisements. That the Barkwell-Farr people will derive a large and permanent increase in their already extensive business as a result of the present publicity campaign goes without saying.

◆

## NEW STOCK OF THE BARRETT COMPANY

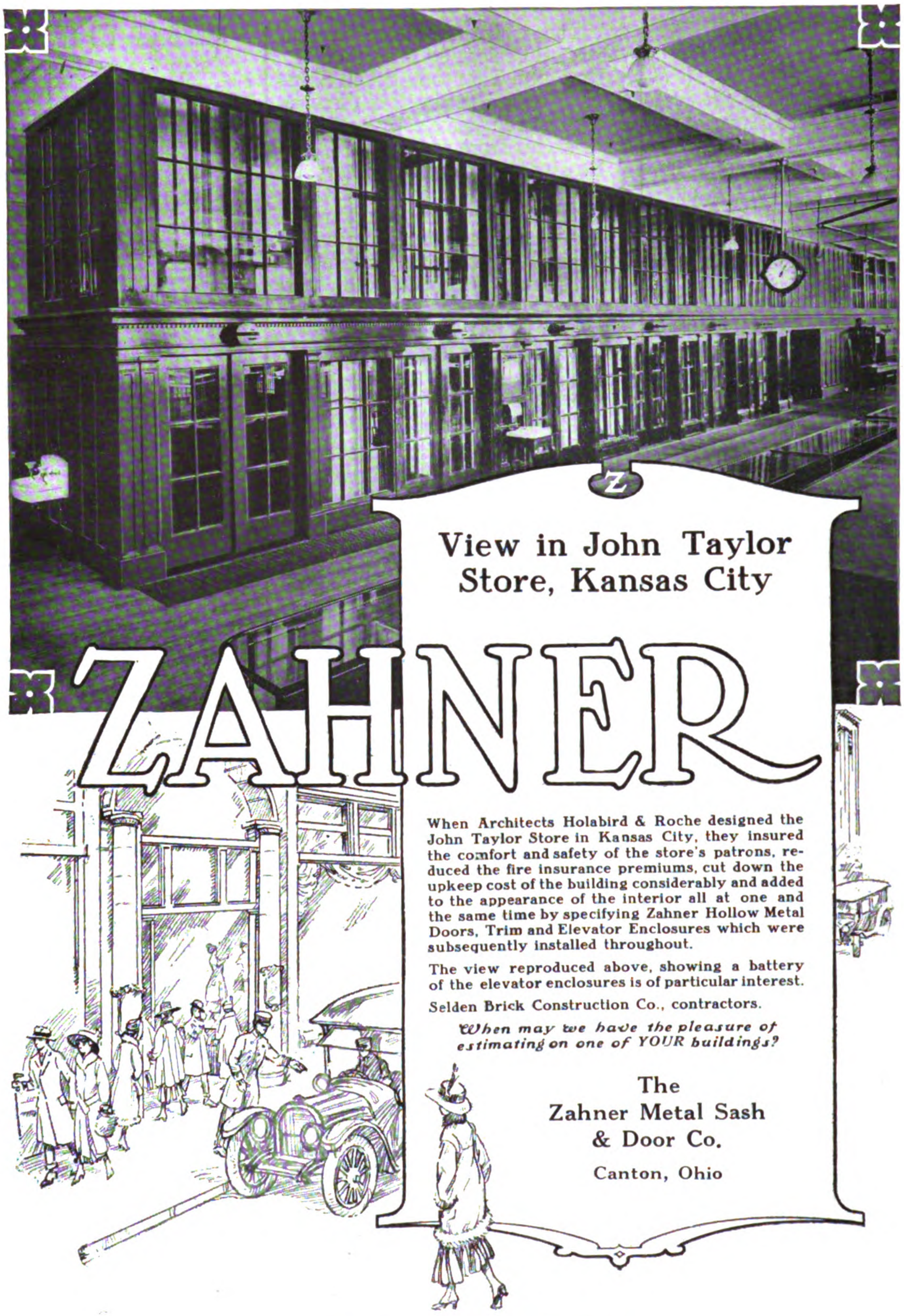
To still further extend its already great business, the Barrett Company, of New York, will increase its capital by several millions of dollars. The preferred stock will be increased from $5,000,000 to $12,500,000, and the common stock from $15,000,000 to $25,000,000. The corporation is efficiently managed, and its growth is along lines of safety and permanence.

◆

*Some have a talent for doing the superfluous.*

◆

*A banquet is a mixture of courses and discourses.*



View in John Taylor Store, Kansas City

# ZAHNER

When Architects Holabird & Roche designed the John Taylor Store in Kansas City, they insured the comfort and safety of the store's patrons, reduced the fire insurance premiums, cut down the upkeep cost of the building considerably and added to the appearance of the interior all at one and the same time by specifying Zahner Hollow Metal Doors, Trim and Elevator Enclosures which were subsequently installed throughout.

The view reproduced above, showing a battery of the elevator enclosures is of particular interest.

Selden Brick Construction Co., contractors.

*When may we have the pleasure of estimating on one of YOUR buildings?*

The
Zahner Metal Sash
& Door Co.
Canton, Ohio

**THE ZAHNER METAL SASH AND DOOR CO.**

CANTON
THE CITY OF DIVERSIFIED INDUSTRIES

*Branches in all Principal Cities*

*New York Office 42nd Street Building*

## EMPLOYERS ASSOCIATION AT LOUISVILLE

A late Louisville, Ky., incorporation is the Employers' Association, the avowed purpose of which is to adjust local labor disputes, to create a free employment bureau and in other ways seek to remove the possibility of disturbances in the industrial field. The leading spirits in the organization are: Henry Vogt, president Henry Vogt Machine Company; Charles F. Huhlein, president B. F. Avery & Sons Company, and W. Hume Logan, president Dow Wire and Iron Works, all of Louisville.

◆

## PLAN ENDORSED BY BUILDERS

A course in preliminary architecture has been established by the Grand Rapids, Mich., branch of the Young Men's Christian Association. It is not intended to prepare full-fledged architects, but rather to give such training as will equip the students after graduation and some practical experience to capably fill such positions as building foremen, superintendents and contractors. The move has the complete endorsement of the Building Exchange of its home city and will be welcomed by the building fraternity generally.

◆

The Emerson Pump and Valve Company, of Alexandria, Va., has issued its 1917 catalogue, a most interesting treatise on the manufacture, construction and use of a standard steam pump. The booklet contains 48 pages of well-illustrated matter and should be in the hands of every engineer and contractor.

◆

An extension of the factory of the Newark (N. J.) Wire Cloth Company is in progress.

◆

Work upon the new factories of the Ford Motor Company upon the meadows of Kearney, N. J., is under way. It is understood the initial construction will consist of five four-story buildings.

◆

The Eagle River Concrete and Construction Company, of Eagle River, Wis., is adding new machinery and other equipment for the manufacture of cement and concrete products.

◆

With a capital of $80,000, the Portage Brick Company has been formed at South Bend, Ind. It will manufacture brick.

## FIREPROOF COLD STORAGE WAREHOUSE

From plans prepared by J. B. Snook & Sons, the Turner Construction Company is now erecting in New York City what will be the largest and most complete cold storage warehouse in the country. It will be fireproof throughout, and for its completion 30,000 yards of gravel, 20,000 yards of sand, 60,000 barrels of cement, 1,000,000 feet of lumber and 1,500 tons of reinforcing steel will be required.

◆

## CEMENT SILO CONSTRUCTION

The Farm Bureau of the Portland Cement Association is conducting a campaign to help cement products manufacturers enter the cement stave silo business in sections of the country where no concrete silos are being built at present. A number of well-equipped plants in different parts of the country are now planning such a departure. Any others interested and desiring co-operation should communicate with the Farm Bureau of the Portland Cement Association, 111 West Washington street, Chicago.

◆

## ENGINEERS APPROVE TESTS

The new standard specifications and tests for Portland cement of the American Society for Testing Materials, effective January 1, 1917, were approved by the American Railway Engineers Association at its recent convention in Chicago.

◆

The Van Guilder Double Wall Company succeeds to the business of the Van Guilder Hollow Wall Company, of Rochester, N. Y.

◆

To meet the increased demand for its product the United States Expansion Bolt Company, of New York City, has purchased the former Columbia, Pa., plant of the Columbia Malleable Iron and Steel Company.

◆

For the proper housing of its employees, the American Cast Iron Pipe Company will erect 100 houses and model tenements near its Acipco, Ala., plant.

◆

Owing to international complications and the consequent state of internal affairs that are likely to follow, the spring meeting of the Portland Cement Association, which was to be held in San Francisco, April 16-18, inclusive, has been postponed indefinitely.

◆

An extensive plant for the manufacture of concrete tile roofing will shortly be erected by the Roanoke Cementile Company, Roanoke, Va.

◆

With a capital of $30,000,000, the Inland Steel Company will seek organization under the laws of Delaware.

◆

A new incorporation at Morgantown, N. C., is the Duckworth Brick Company, with a capital of $100,000.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

of "CONSTRVCTION," published monthly at New York, N. Y., for April 1, 1917.

State of New York, County of New York:

Before me, a Commissioner of Deeds in and for the State and county aforesaid, personally appeared G. A. Watson, who, having been duly sworn according to law, deposes and says that he is the General Manager of "CONSTRVCTION," and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Constrvction Publishing Company, 1457 Broadway, New York.

Editor—C. Stanley Taylor, 1457 Broadway, New York.

Managing Editor—None.

Business Manager—G. A. Watson, 1457 Broadway, New York.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.):

Constrvction Publishing Company, 1457 Broadway, New York.
G. A. Watson, Cranford, N. J.
Louise C. Watson, Cranford, N. J.
Jeannie Molinari, 46 Hemlock Street, Brooklyn, N. Y.
C. Stanley Taylor, 1457 Broadway, New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is: (This information is required from daily publications only.)

G. A. WATSON, General Manager.

Sworn to and subscribed before me this 31st day of March, 1917.

[Seal] W. J. SMITH.

(My commission expires April 27, 1917.)

*She:* "If we must cut down expenses, why not drop your life insurance?"
*He:* "Not much. That's *your* insurance, not mine. I figure we can trim about all the other items so as to save at least $400 a year, and I'm going to take a hundred of that and buy another Postal policy while I can get it. You and the kiddies may be glad some day."
*She:* (thoughtfully) "I guess you're right at that, Jim."

**Put Life Insurance in Your Family Budget —and Keep It There**

THE *real* husband always makes a liberal allowance for life-insurance whether his wife wants him to or not, but the sensible woman *does* want him to when she considers it seriously.

And whether times are hard or easy they both want the most protection possible for their money, and hundreds of them during the last decade have therefore been turning to the

**POSTAL LIFE INSURANCE COMPANY**

The Postal employs no agents but issues its policies direct. Agents' commissions and office-expenses are thus saved and go to its policyholders.

It is not alone the Company of Safety and Service but also of Saving, for you will find net cost low—lower than ever before—because the Postal's actual underwriting experience has enabled it now to make a

**10%** **reduction in premium rates with a continuance of the annual guaranteed dividend of** **9½%**

***Besides these savings, the Company pays the usual contingent dividends, depending on earnings.***

If you are in good health you should take advantage of the 10% reduction in premium-rates and other Postal economies.

**Find Out How Much *You* Can Save At Your Age**

on any standard form of Policy—Whole-Life, Limited-Payment Life, Endowment, Joint Life, or on a Monthly Income Contract.

The Postal issues all of the standard forms, and operates under the strict supervision of the New York State Insurance Department and is subject to the United States Postal authorities.

To get exact figures for your age, simply fill out the coupon and mail today.

Remember: No agent will be sent to visit you. The Postal Life employs no agents; resultant commission-savings go to *you* because you deal *direct*.

**POSTAL LIFE INSURANCE COMPANY**
WM. R. MALONE PRESIDENT
THIRTY-FIVE NASSAU STREET NEW YORK

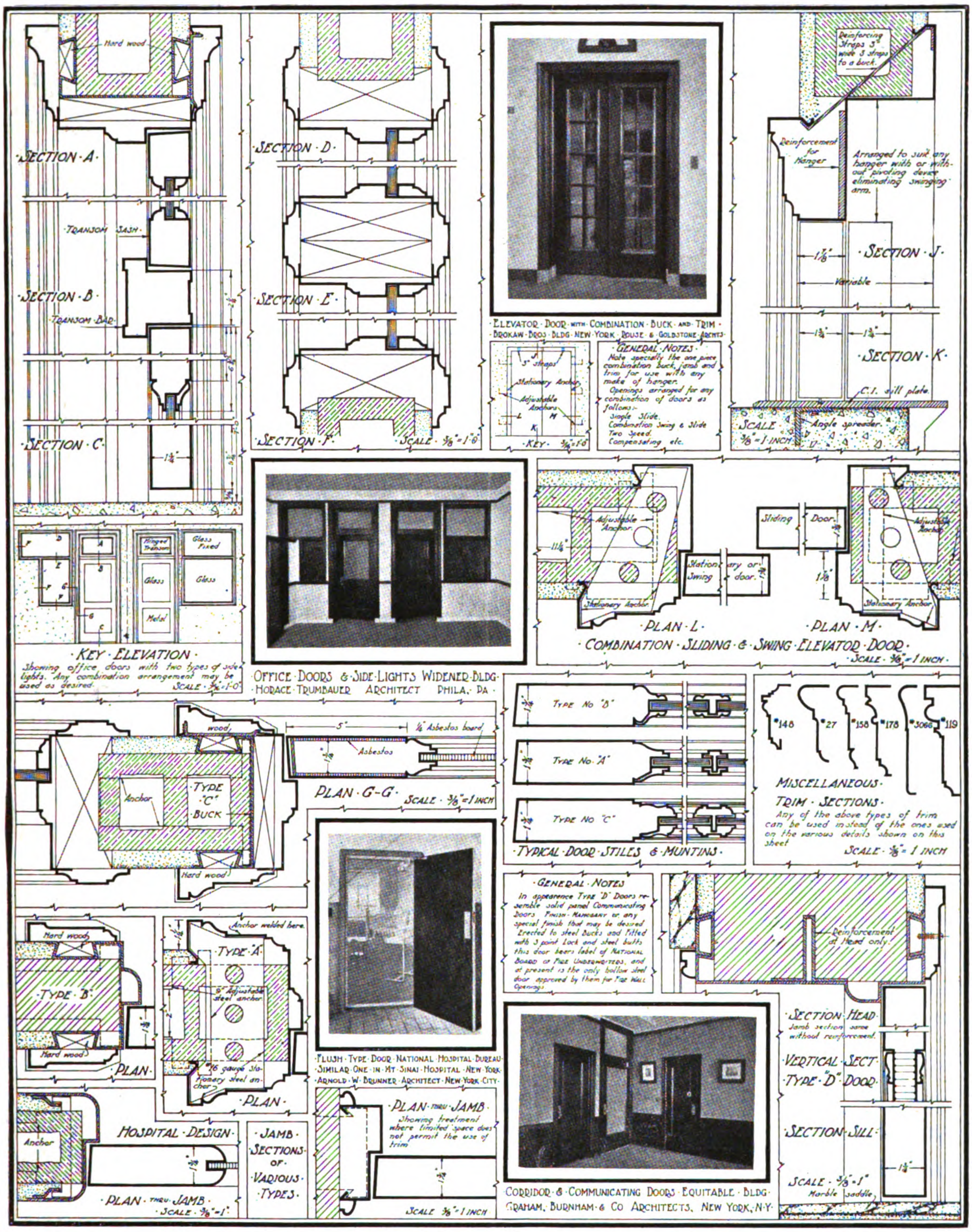
**Postal Life Insurance Company**
**35 Nassau St., N. Y.**

Without obligating me, please send full insurance particulars for my age.

*Name* ..........................
*Address* ..........................
..........................
*Occupation* ..........................
*Exact date of birth* ..........................

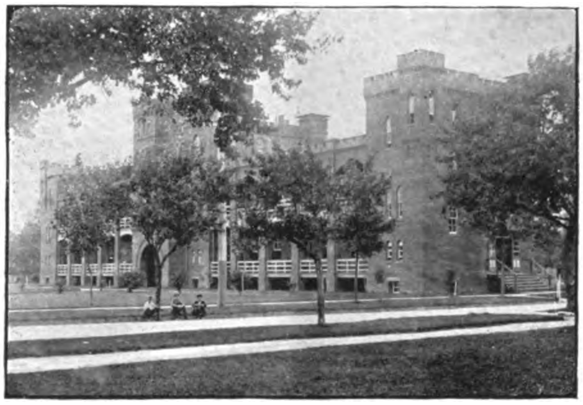
# FIRE SAFE DOOR WAYS

## *STEEL DOORS, BUCKS and TRIM*


SECTION A.
TRANSOM SASH
SECTION B.
TRANSOM BAR
SECTION C.
Hard wood
SECTION D.
SECTION E.
SECTION F.
SCALE 3/8"=1'-0"
ELEVATOR DOOR WITH COMBINATION BUCK AND TRIM
BROKAW BROS BLDG NEW YORK ROUSE & GOLDSTONE ARCHTS
3" straps
Stationary Anchor
Adjustable Anchors
KEY 3/16"=1'-0"
GENERAL NOTES
Note specially the one piece combination buck, jamb and trim for use with any make of hanger.
Openings arranged for any combination of doors as follows:-
Single Slide.
Combination Swing & Slide
Two Speed.
Compensating etc.
Reinforcing Straps 3" wide 3 straps to a buck.
Reinforcement for Hanger
Arranged to suit any hanger with or without pivoting device eliminating swinging arm.
SECTION J.
Variable
SECTION K.
C.I. sill plate
Angle spreader
SCALE 3/8"=1 INCH
KEY ELEVATION
Hinged Transom
Glass Fixed
Glass
Metal
Showing office doors with two types of side lights. Any combination arrangement may be used as desired.
SCALE 3/8"=1'-0"
OFFICE DOORS & SIDE LIGHTS WIDENER BLDG.
HORACE TRUMBAUER ARCHITECT PHILA. PA.
Adjustable Anchor
Stationary or Swing door.
Sliding Door.
Stationary Anchor
PLAN L.
PLAN M.
COMBINATION SLIDING & SWING ELEVATOR DOOR.
SCALE 3/8"=1 INCH.
wood
Anchor
TYPE "C" BUCK
Hard wood
5"
1/4" Asbestos board
Asbestos
PLAN G-G. SCALE 3/8"=1 INCH
TYPE No "B"
TYPE No "A"
TYPE No "C"
TYPICAL DOOR STILES & MUNTINS.
148 27 158 178 3066 119
MISCELLANEOUS TRIM SECTIONS.
Any of the above types of trim can be used instead of the ones used on the various details shown on this sheet
SCALE 3/8"=1 INCH
Hard wood
TYPE B
PLAN
Anchor welded here
TYPE A
5" Adjustable steel anchor
16 gauge stationary steel anchor
PLAN
FLUSH TYPE DOOR NATIONAL HOSPITAL BUREAU
SIMILAR ONE IN MT SINAI HOSPITAL NEW YORK
ARNOLD W. BRUNNER ARCHITECT NEW YORK CITY
GENERAL NOTES
In appearance Type "D" Doors resemble solid panel Communicating Doors Finish - Mahogany or any special finish that may be desired Erected to steel Bucks and Fitted with 3 point Lock and steel butts this door bears label of NATIONAL BOARD OF FIRE UNDERWRITERS, and at present is the only hollow steel door approved by them for Fire Wall Openings
Reinforcement at Head only
SECTION HEAD
Jamb section same without reinforcement
VERTICAL SECT TYPE "D" DOOR
SECTION SILL
SCALE 3/8"=1"
Marble saddle
Anchor
HOSPITAL DESIGN
PLAN THRU JAMB SCALE 3/8"=1"
JAMB SECTIONS OF VARIOUS TYPES
PLAN THRU JAMB
Showing treatment where limited space does not permit the use of trim
SCALE 3/8"=1 INCH
CORRIDOR & COMMUNICATING DOORS EQUITABLE BLDG.
GRAHAM, BURNHAM & CO ARCHITECTS, NEW YORK, N.Y.

# ·EMPIRE·ART·METAL·COMPANY·

·COLLEGE POINT· ·NEW YORK· ·U·S·A·



National Soldiers Home. Virginia. covered with 6500 square feet of "Merchant's Old Method"

"MERCHANT'S OLD METHOD"

ROOFING TIN

has been the accepted standard quality roofing plate for the last quarter of a century. When properly applied it makes a roof that is light, clean, sanitary, and a thorough protection from fire, lightning and storm.

COPPER BEARING BASE

VERY HEAVY COATING PALM OIL PROCESS

"Merchant's Old Method" is used extensively by The United States Government, Bethlehem Steel Co., Du Pont Powder Co,, John A. Roebling Sons Co., Hamilton Watch Co., and many others.

SEND FOR SAMPLES AND PRICES

*Manufacturers of*

EVANS "ALMETL" FIRE DOORS
FIRE RETARDING "STAR" VENTILATORS

MERCHANT & EVANS Co
PHILADELPHIA

NEW YORK
BALTIMORE
ATLANTA
CLEVELAND
WHEELING
CHICAGO
ST. LOUIS
KANSAS CITY

# CONSTRVCTION

## ADVOCATING THE CONSISTENT VSE OF FIREPROOFING MATERIALS & PROTECTIVE DEVICES

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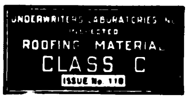

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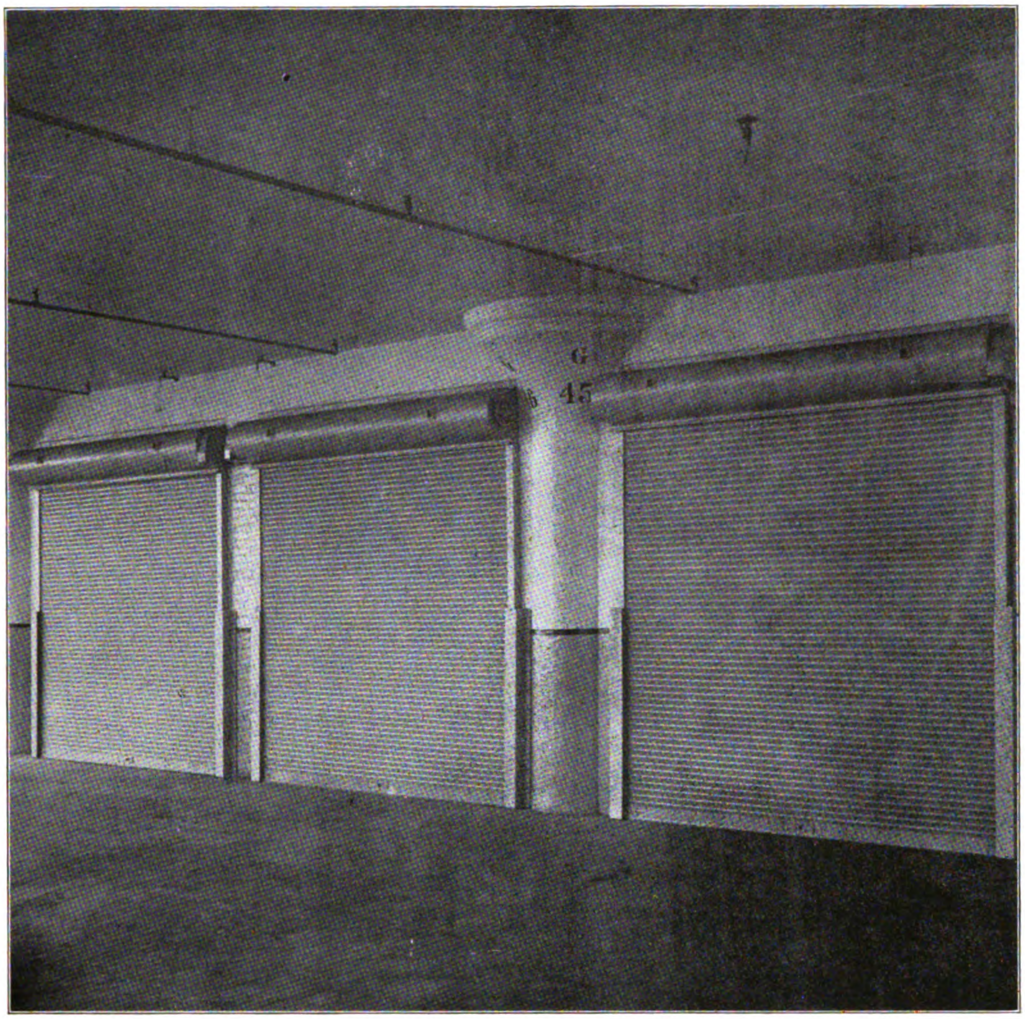

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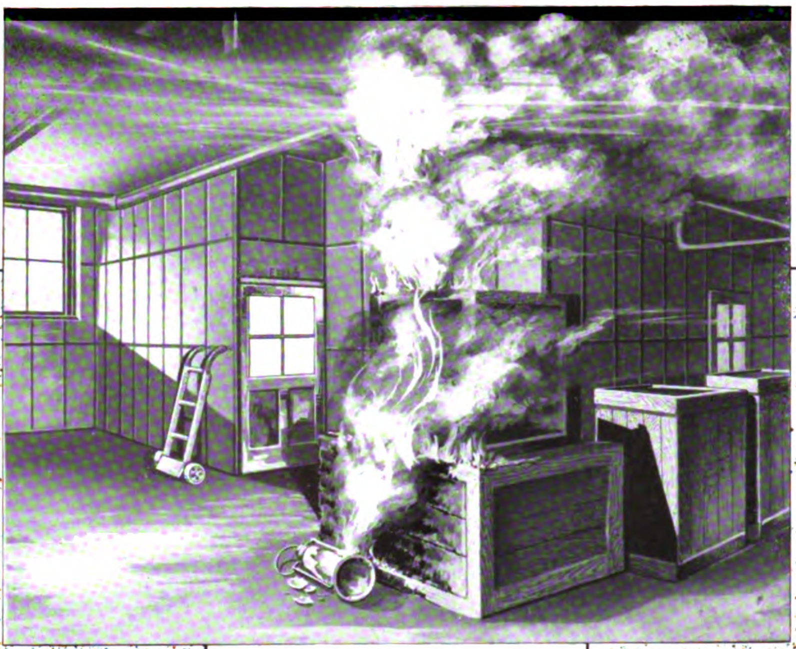

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CONSTRVCTION
ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. IV MAY, 1917 No. 5

## *Importance of the Work of the National Fire Protection Ass'n to the Public*

THE National Fire Protection Association held its twenty-first annual meeting in Washington, D. C., on May 8, 9 and 10 last. Its sessions on the 8th and 10th were held at the New Willard Hotel, those of the 9th at the United States Bureau of Standards.

It was peculiarly appropriate for the association to depart from its usual practice of holding its annual meetings alternately in New York and Chicago, and to hold this year's gathering in Washington, because of the National importance of its work. The country at large should know of the far-reaching beneficial effect of the activities of the organization, and this knowledge was probably furthered by the decision to hold the meeting in the capital city. This also enabled the association to get into closer touch with the officials of the National Government than would have been possible had the convention taken place in New York.

The National Fire Protection Association embraces in its membership institutions and individuals from Canada as well as the United States, and has a hard-working, effective Canadian committee made up of persons from all parts of the Dominion. So the association efficiently serves the North American continent.

Elsewhere in this issue will be found articles on different phases of the work of the association, which illustrate in some measure the value to the public at large of its activities.

We mention here briefly some of the important and timely subjects to which the association has been giving careful and unselfish work. The mere naming of the subjects will tend to show the especial importance of the work during the present war time.

The following brief list giving only a few of the subjects considered shows that the association is alive to matters of especial interest to the country at large just now:

"Marine Fire Hazards."

"Hazards of Ammunition Manufacture, Storage and Transportation."

"Safeguarding Ammunition Factories."

"State Regulation of Ammunition Storage and Manufacture."

"Transportation of Explosives."

"Safety to Life."

"Explosives and Combustibles."

The list is, of course, only a part of the large field of endeavor covered by the association and treated in an expert manner, as the membership of committee is invariably composed of experts in the particular questions considered by such committees.

The more the public at large appreciates the usefulness of the National Fire Protection Association the better will it be for the country at large, and CONSTRVCTION hopes that this appreciation will rapidly become more general and result in a greatly enlarged membership of the organization.

## *How Fire Safety Pays*

ALIVE to the direct and indirect loss suffered by a community through a sweeping fire, the Board of Trade of Dover, N. J., last year paid considerable attention to the fire hazard, with the result as set forth by Secretary Davidson in the following statement:

"As a result of the continual urging of your active officers, the insurance survey of the city, which was under way by the Schedule Rating Office, was completed and a basis fixed for the reduction in rates, such being on required improvement to the water supply and the fire department. This requirement was used as the basis of a great fire prevention celebration, which lasted for an entire week during the month of October, your secretary preparing for distribution a large amount of printed matter which was delivered to every house and office in the city. Your secretary also made addresses before the theatre audiences upon the subject and secured the services of a well-known engineering expert to present to the board and its guests a detailed statement as to Dover's needs and its demand for better fire prevention."

# *High Wind and Wood Shingle Roofs Cost Atlanta $5,000,000*

DENYING emphatically the report that the conflagration which swept Atlanta, Ga., on May 21st, causing a property loss of not less than $5,000,000, was of incendiary origin, Mayor Candler said:

"There is not a single evidence that the fire started from incendiaries. It was purely and simply the result of accident, a high wind and *wood shingle roofs*."

Starting in the poorer negro quarter of the city, the fire, driven by a severe wind, rapidly spread to the better white residence section, finally reaching Ponce de Leon avenue, perhaps the most exclusive residential district in the city.

In all, nearly fifty-two blocks were swept bare, destroying 1,563 homes. While local estimates place the loss at $3,500,000, underwriters assert that the insurance loss alone will aggregate $4,000,000, and that an additional $1,000,000 should be allowed for uninsured values.

Mayor Candler's version as to the reason for the disastrous fire—"an accident, high wind and wood shingle roofs"—cannot be allowed to stand in its entirety. An accident is defined lexographically as something that cannot be foreseen or safeguarded against. This could hardly apply to the combination of "high wind and wood shingle roofs," the fire menace of which was not only patent even to laymen, but had been repeatedly pointed out by fire prevention authorities.

W. B. Cody, chief of the Atlanta fire department, fully appreciated the danger to which his city was constantly exposed through the too free use of the spark-inviting and fire-loving wooden shingle, and actively supported a movement to have passed an incombustible roofing ordinance by the Common Council. Insurance men and other clear-visioned and public-spirited citizens advocated the measure, but the opposition of the lumbermen, aided and abetted by the indifference of the average property-owner, proved too strong to be overcome, and the statute that might have prevented so serious a loss to the Gate City as that of the 21st instant, failed of early enactment.

The blame for the conflagration cannot, Mr. Candler, to the contrary notwithstanding, be laid to "accident," but instead must be shouldered by all who actively or passively aided in deferring the anti-wood shingle measure championed by Fire Chief Cody.

Augusta, Paris, Nashville and Atlanta have within twelve months been added to the long, long list of American communities that have paid heavy toll to the fire demon through his chief medium of destruction—the wood shingle roof.

When will the people of the South and of the country at large wake up to the seriousness of this form of roofing and finally and fully prohibit its use?

For the benefit of cities, towns or villages that would escape sweeping fires, the adoption of a roofing ordinance based upon the subjoined suggestions of the National Board of Fire Underwriters is respectfully recommended.

### Approved Fire-Resistive Roofing

Section VII. Par. 3. Roofing which shall at least meet the requirements of the test specified in Sec. 174, Par. 8.

NOTE.—This definition refers only to the lowest grade of roofing material which may be approved for use within city limits or upon buildings which offer moderate exposure. High grade roofings should also be tested and classified to determine their adaption for more severe exposure.

### Roof Covering

Section 80, Par. 1. All buildings, except as given below, shall have roof coverings of approved standard quality, such as brick, concrete, tile or slate; or highest grade of tin roofing, or of asbestos shingles, or of built-up roofing felt with gravel or slag surface, or of built-up asbestos roofing; or other roofings of like grade which would rank as Class A or B under the test specifications of the National Board of Fire Underwriters.

Exceptions:

(a) Dwellings.
(b) Frame buildings.
(c) Buildings not exceeding two stories or thirty feet in height and 2,500 square feet in area and not used for factories, warehouses or mercantile purposes.

Par. 2. The quality of roofing for all dwellings and other buildings exempted in Par. 1 shall be as therein specified; or may be of a grade not lower than that indicated in the definition of approved fire-resisting roofing, Sec. 7, Par. 3; or of a grade which would rank not lower than Class F under the test specifications of the National Board of Fire Underwriters.

Par. 3. A layer of deadening felt at least one-sixteenth-inch thick shall be placed between metal roofing and the supporting woodwork.

NOTE.—The purpose of the felt is to prevent quick ignition of the wooden decking when the roof is exposed to burning brands or radiated heat.

Par. 8. This section shall not be construed to prohibit the repairing of a wooden shingle roof, providing the building is not increased in height, but the renewal of such a roof is forbidden. No existing wooden shingle roof, if damaged more than 10 per cent, shall be repaired with other than approved roofing.

NOTE.—In addition to the above it is suggested that a clause be inserted in the building ordinance, stating that on or before a certain date, any or all roofs now covered with wooden shingles shall have them replaced with approved roofing material corresponding with the requirements for new buildings. The date should be made as early as consistent with securing to the owners of the buildings a reasonable service for roofs which may have been constructed prior to the adoption of the building code.

### Fire Tests for Approved Fire-Resisting Roofing

Section 174, Par. 8. The roofing shall at least withstand the attack of burning fire brands for five minutes with a wind pressure of five miles per hour without ignition of a clear, dry wood pine decking beneath it, and shall not crack and expose the decking nor slip badly, nor convey or communicate fire badly, nor produce a serious flying-brand hazard when thus exposed. The test shall be made with a sample at the maximum angle of inclination advocated in practice. The brands shall consist of at least ten strips of seasoned hard maple 2 inches square and 3 feet long, formed into a frame or grid with a 1¾-inch space between them. The complete grid shall be thoroughly ignited and burning before application to the roof sample, which latter shall extend at all sides at least 18 inches beyond the edges of the grid.

NOTE.—The testing and classification of roofings according to their degree of fire resistance is extremely technical and difficult. It is recommended that only such roofings be used as have been approved after being submitted to the full schedule of test specifications for roofings as applied by the Underwriters Laboratories. That schedule includes the following tests: flame exposure, burning brand and heat radiation tests, each at wind velocities of five and forty miles per hour. Also tests to determine the effect of fire streams, physical and chemical tests, an investigation of practibility, durability and uniformity.

*The conflagration hazard of inflammable roofs is a most serious menace to every city in which they exist. Ordinary prudence and public safety demand that they cease to be used.*

In the code of "Suggestions for Construction and Fire Protection of Dwelling Houses," as recommended by the National Board of Fire Underwriters, in 1916 is found the following:

### Approved Roofings

Section 30, Par. 1. Wherever possible, use a fire-resistive roof covering. The safety which it offers is well worth the additional expense. There is a variety of approved roofings on the market which will afford satisfactory protection and service; a number of them are but little more expensive than first-class wooden shingles. The first cost of a roofing material must be averaged with the years of service it will render, in order to ascertain the real expense of maintaining the construction. The life of the best fire-resistive roofings is considerably longer than that of the wooden shingles, and this fact should be considered in selecting. Among the recommended roofings are tile, tin, slate, asbestos shingles and other composition shingles and prepared roofings which have been tested and approved for fire-resistance and durability.

Par. 2. The fire resistance of ordinary roofs can be considerably increased by covering the rafters on the underside with metal lath and plaster, asbestos mill board or asbestos building lumber, gypsum plaster board or any other incombustible heat insulating material. Such coverings add much to the comfort of the house by making the attic cooler in summer and warmer in winter. The insulation can be further improved by a two-inch layer of mineral wool placed between the rafters and supported by any of the board materials above mentioned. Gypsum plaster blocks could also be employed for this purpose. Such construction is particularly advantageous when sleeping rooms are located in the attic.

NOTE.—It is recommended that a layer of non-inflammable roofing felt be laid on the roof decking before tin roofing is applied. It serves as an insulator and will prevent ready ignition of the decking in case the tin were subjected to fire brands or severe radiant heat. It also aids in keeping the attic cool in hot weather.

---

TO aid in its campaign for greater fire safety in the Keystone State, the Fire Marshal's Office, of Pennsylvania, has prepared a special form for use by fire chiefs, public officials and fire insurance companies represented in the Commonwealth.

Among other items called for is the kind of structural material of the limed building, and its especial fire protection, if any.

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# National Fire Resistance Council

AT the National Fire Protection Association's annual meeting, recently held in Washington, D. C., there were a number of valuable and highly interesting committee reports presented and discussed.

Comment on some of these is timely, as several of the reports made distinct and, in some cases, radical suggestions.

### Fire-Resistive Construction

This committee, of which Prof. Ira H. Woolson is chairman, presented a report which was tentatively adopted. This report is discussed in an article elsewhere in this issue of CONSTRVCTION. It is to the recommendations of this committee that we referred in our former issue in the brief reference to classifications of materials by tests.

The National Fire Resistance Council is in hearty sympathy with the work and recommendations of the Committee on Fire-Resistive Construction and would urge its members to read with especial care the article dealing with the work of the committee, which appears elsewhere in this issue.

### Safety of Life

The report of the Committee on Safety of Life, of which H. W. Forster, of Philadelphia, is chairman, has made an intensive and intelligent study of exits from buildings. Its recommendations were copiously illustrated by charts which were projected on a screen, while Mr. Forster explained the committee's recomdations.

1. That (excepting a horizontal exit be provided) only so many persons should be allowed on each floor as can safely find refuge on the stair and in stair enclosures.

2. That the maximum emptying time be the determining factor, and that with average and better class buildings the number of persons allowed per floor be frankly in excess of the stair and the stair enclosures.

The committee assumed that life is safer against fire in buildings where:

(A) Construction is slow-burning or non-combustible rather than joisted.

(B) Sprinklers are provided.

(C) Vertical openings are partially or fully protected rather than open.

(D) Buildings are low, rather than high.

(E) Contents are of moderate or low, rather than of high inflammability.

The committee took the position that life is more secure where better construction, protection or occupancy conditions prevail, and presented their judgment in these matters in percentages.

Based on these principles the committee prepared a chart of proposed capacity in number of persons per unit of stair width in different types of buildings.

The important feature of the committee's report is that it takes the stand that life is safer in well-constructed buildings and best protected in well-constructed buildings which are protected by automatic sprinklers.

With these conclusions the National Fire Resistance Council is in hearty sympathy.

### United States Bureau of Standards

A remarkable evidence of the widespread interest in fire protection was the fact that the National Fire Protection Association held its 1917 annual meeting in Washington, and held its session on May 9 in the large lecture room at the Bureau of Standards. The members spent other hours after the close of the session in an inspection of the wonderful equipment that the Government possesses at the Bureau of Standards.

That Government officials are taking a very lively interest in the subject of fire protection and good construction is evidenced by the fact that Dr. S. W. Stratton, the director of the United States Bureau of Standards, was re-elected as a member of the executive committee of the association.

Mention has been made in these columns of the fact that the United States Bureau of Standards has advisory committees working in conjunction with the Bureau officials on different phases of structural investigations.

One of these is the stucco investigation which has been in progress for three years and under the auspices of the Advisory Committee there has been erected a building containing panels of various mixtures of stucco on various backgrounds. The exigencies of the war situation have made it necessary for this building to be placed in use, so that some of the panels will have to be removed, and to this extent the investigation will be interrupted.

Another of the investigations which the Bureau had engaged upon is in connection with fire tests of wall construction. There has been erected at the Bureau a large panel furnace, and a program of tests was arranged which it was intended to conduct in this furnace to give the relative values of a great many types of wall and partition constructions. Unfortunately here, again, the demands of the war situation have interrupted this work and there is not available from

(*Continued on page 223*)

# *Protection of Openings in Walls and Partitions*

ONE of the many interesting and instructive reports submitted at the annual convention of the National Fire Protection Association held at Washington, D. C., early in the present month was that covering the "Protection of Openings in Walls and Partitions."

The subject is one of high importance to all concerned in safeguarding buildings against the spread of fire, and for that reason the article is made to outline in the form of a continuous story the various ideas or suggestions which appear in the report as changes in or additions to former recommendations The committee making the report is composed of a number of well-known engineers and others occupying responsible positions in the fields of building construction or insurance, and the opinions and conclusions they advance should have the earnest attention of readers of CONSTRVCTION.

The article presented below, it should be clearly understood, covers only the advance report of the committee, and many interesting suggestions in connection therewith were made upon the floor of the convention hall. The substance of these comments will form the basis of a further article upon the subject to appear in a later issue of this publication.

### Size and Shape of Doors

In the opinion of the committee:

"Doors shall be designed for openings not exceeding 120 square feet. Doors shall overlap sides and top of wall openings 4 inches. Where steel lintels are used doors shall overlap the masonry 4 inches above upper edge of steel unless such lintels are fireproofed in a manner satisfactory to the inspection department having jurisdiction. Top of door shall conform to incline of track three-quarters of an inch to 1 foot.

"Half-oval chafing strips are required on the back of door, with flat companion strips on the front of the door. Also a flat strip on the front of the door near the bottom.

"Two half-oval chafing strips are required on doors not exceeding 8 feet in height. In doors exceeding this dimension three are required. The half-oval strips shall be placed one-third the distance from the top of the door and about 24 inches from the bottom. When three strips are used the middle strip shall be placed midway between the other two. The length of strips shall be 4 inches less than the door opening. Strips shall be parallel with the door track and bolted through the door to the flat strips on the front of the door with 1/4-inch bolts spaced not exceeding 9 inches, placing the end bolts 1 inch from the ends of the strips.

"Strip on the front door shall be parallel with the door track and so placed as to take the wear of the stay roll. Strip shall be 5 inches less than the width of the door and fastened to the door by 1/4-inch wood screws spaced not exceeding 12 inches apart.

### Relative Sensitiveness of Door Closers

"Two types of devices for the release of fire doors are now in use. The fusible link, or fixed temperature device, has been used for many years. The rate of temperature rise device is of more recent development.

"In order to ascertain the relative sensitiveness of the two types, the proper performance specifications for each, and the conditions which shall govern the selection of either type, a series of tests was conducted at the Underwriters' Laboratories.

"The following conclusions are based upon the observations made during these tests.

"The rate of temperature rise device is far more prompt in operation than fusible links and is therefore better adapted to insure the prompt closing of fire doors and prevent the passage of fire through the opening in walls and partitions. It should be employed where the conditions are such that the spread of fire is likely to be rapid or where the spread of fire through such openings is likely to endanger life.

"In still air and where the ceilings are of ordinary height, an approved device of this character properly installed and adjusted will reliably operate within 1 minute when exposed to a freely burning fire covering an area not more than 3 feet square and located 10 feet from and directly in front of the wall opening.

"Approved fusible links, when properly mounted close to but not in contact with the ceiling, may be depended upon to release automatic fire doors and prevent the passage of fire through openings where the conditions are such that the spread of fire is not rapid and where the spread of fire through such openings is not likely to endanger life.

"In still air and where the ceilings are of ordinary height, an approved fusible link, properly installed, will reliably operate within 3 minutes when exposed to a freely burning fire covering an area of not more than 3 feet square located 10 feet from and directly in front of the wall opening.

### Automatic Doors

"Where conditions are such that the spread of fire is likely to be rapid, or where the spread of fire through wall openings is likely to endanger life, the fire doors shall be operated by an approved automatic closing device that will reliably operate in still air within 1½ minutes when exposed to a freely burning fire covering an area of no more than 3 feet square located 10 feet from and directly in front of the wall opening.

"Where the conditions are such that the possibility of the rapid spread of fire through the wall openings is negligible, and where the spread of fire through such openings is not likely to endanger life, the fire doors may be operated by an approved closing device that will reliably operate in still air within 3 minutes when exposed to a freely burning fire covering an area of not more than 3 feet square, located 10 feet from and directly in front of the opening.

NOTE:—"It should be noted that the question is not so much that of rise of temperature as of rapidity of spread, and that in all situations where a rapidly spreading fire appears possible, the sensitive device should be used. Such situations include those where there is a liability of a train of flammable material leading through the opening, or where highly flammable material is stored on each side of the opening in such close proximity to it that fire could jump through the opening before generating sufficient heat to fuse the links.

"Attach a releasing device securely to wall on both sides of the wall and close to ceiling. Attach pulleys securely to outer end of fire door track. Pass cord through loose pulley on counter-balance weight and over pulley on track and attach one end to the front edge of the fire door near the top and the other end to the releasing device, first adjusting the length of the cord so that the weight is raised a few inches above the floor when the door is in the fully opened position. Attach chain on weight to the wall so that the release of the weight will cause it to swing and strike the rear edge of the fire door.

"If the releasing device is actuated by a fusible link, its construction must be such that the link is not stressed beyond its rated capacity with the required factor of safety. Fusible links shall be placed directly over the wall opening.

"Attach a heat actuated device securely to the wall on both sides of the wall and close to the ceiling. Attach releasing and closing devices to wall on one side of and above the door. Connect heat actuated device to releasing device. Attach pulley to wall above door near the lock side, suspend weights to release device, attach one end of chain to pilot weight, pass through suspended weight over pulleys on wall and attack other end to top of fire door, first adjusting the length of the chain so that the pilot weight travels freely when the door is opened and closed.

"If heat actuated device is a fusible link, care should be taken to see that the release device is so designed that the link is not stressed beyond its rated safe load with the required factor of safety. Fusible links shall be placed directly over the wall opening.

"Attach automatic door closing devices to each fire door as described for single swinging fire doors and install interfering devices so that the standing door will close and latch first.

"Attach a releasing device securely to the wall on both sides of the wall and close to ceiling. Attach pulleys to wall above counterbalance weight and over pulley on wall, and attach one end to the releasing device and the other end to the fire door at the middle near the top, first adjusting the length of the cord so that the counter weight will travel freely when the door is opened and closed. Attach chain on weight to wall so that weight will not strike floor when released.

"If the releasing device is actuated by a fusible link, its construction must be such that the link is not stressed beyond its rated capacity with the required factor of safety. Fusible links shall be placed directly over the wall opening.

### Size Limitations for Fire Windows

"During the past year fire tests of five fire windows for openings 10 feet wide and 12 feet high, provided with unprotected steel mullions between the sash, which varied from 5 to 6 feet in width, have been made at the Underwriters' Laboratory. The results of these tests clearly show that, when properly mounted, certain patterns of windows furnish a high degree of fire protection when made in larger unit sizes than the regulations now permit, and that certain forms of unprotected non-bearing steel mullions can be depended upon to provide a much higher degree of resistance to fire than the fire windows they support.

### Mullions

"Non-bearing mullions and horizontal division members shall be securely fastened in place and capable of resisting all wind stresses and other stresses to which they are normally subject, and exposure to severe fire without the formation of openings or the introduction of other defects that will seriously detract from the weathering or fire retardant properties of the windows they support.

### Size of Fire Windows

"Metal frame containing the sash or glass shall not exceed 7 feet by 12 feet between supports. Larger openings must be reinforced at every point of division by mullions or horizontal members as specified in Rule 100.

### Size and Shape of Shutters

"Shutters shall fit snugly into or overlap sides and top of window opening. Bottom of shutter shall fit the sill closely where it is not practical to lap it. Shutters in pairs shall fit closely where they come together at the middle.

### Additional Classifications

"Attention has been called to the increasing demand in several sections of the country for approved devices that will replace the combustible devices now commonly used in exterior wall openings, subject to light exposure, for devices that possess sufficient fire retardant value to prevent the travel of fire from story to story on the outside of buildings and that it may not be necessary to provide with all of the features required in devices used in situations subject to the more severe fire exposures.

"In order to meet this demand we recommend the adoption of the following additional classification:

### Class F—Where Subject to Light Fire Exposure

"Openings in exterior walls subject to light fire exposure can be efficiently protected by devices that may not be effective under the more severe fire exposures on the exterior of buildings. Only such fire-retardants are included in this class as have been shown by experience and tests to furnish a fairly high degree of fire protection when installed on one side of exterior walls subject to a light fire exposure, and, if used at exit openings, to offer no serious accident hazard under normal or emergency conditions in this situation.

"Fire retardants fulfilling Class A, B, C, D, or E requirements can be employed for the protection of openings in exterior walls subject to light fire exposure where the type and pattern are suitable.

### General Regulations

"The general regulations for Class E shall also apply to this classification.

### Fire Windows

"Wired glass windows of this classification are fairly substantial in construction, practical under most conditions, easy to install and to maintain, furnish a fairly high degree of resistance to fire, but the inherent limitation of the larger glass sizes permissible in this classification restricts the use of such windows to situations subject to light fire exposure.

"For situations where the fire exposure is light they will prevent the spread of fire from one building to another, and from one story to another on the outside of the same building.

### Size of Fire Windows

"Metal frame containing the sash or glass shall not exceed 7 feet by 12 feet between supports. Frames for larger openings to be reinforced at every point of division by mullions or horizontal structural members constructed as specified in Rule 100.

"NOTE:—The height of openings with a segmental top should be measured from the crown, rather than the spring line of the arch.

### Size of Glass

"Size of wired glass lights not to exceed 48 inches in either dimension."

## Warns Against Fires in Granaries

UNDER the revised law of Kansas, the State Fire Marshal is given broader powers than formerly, the result of which should make for increased efficiency in his department.

Among other features of the new statute is the prohibition of "the use of kerosene in building fires in schoolhouses."

### Protect the Granaries

An appeal to the mill owners of Kansas to be especially zealous in safeguarding the grain in their charge against fire damage has recently been made by State Fire Marshal L. T. Hussey.

In part, Marshal Hussey said:

"Almost every day a storehouse of grain is consumed by fire somewhere in the United States. Kansas is a grain State. Millions of people are depending on its supply of cereals for necessary food. The grain men of Kansas must, and I believe will, do their part to protect this food supply from needless loss.

"To the ordinary fire hazard of peace times in mills and elevators is now added the hazard of war-time incendiarism. Agents of the German Imperial Government are everywhere, waiting only for an opportunity to strike an effective blow for the Kaiser and his military despotism. They know that a blow at the food supply of America and its allies is as effective as a blow at their forts, arsenals or munition plants.

"Every effort should be made to stop the normal fire waste in grain and its products by seeing that every mill and elevator is kept free from trash and other inflammable materials, that all flues and smoke stacks are in safe condition, and that every possible cause of fire where practicable is removed from the premises. Let every day be a "clean-up day."

"To prevent possible incendiary fires, guards should be placed day and night around all such buildings, loafers and suspicious characters should not be allowed within or about such property, and every precaution taken that might prevent the destruction of grain by an enemy of our country.

"Any attempt at incendiarism of this sort should be reported at once to this office and prompt action will be taken."

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## National Fire Resistance Council

(*Continued from page 220*)

Government appropriations money to carry the contemplated program into effect at this time.

The National Fire Resistance Council thoroughly believes in the closest possible co-operation between the Government and industries, particularly those interested in the protection of fire-resistive and protected buildings and constructions, and that the Bureau of Standards exercises a highly valuable function of Government in this regard.

## *Looking to the Future*

ELSEWHERE in these pages appears a thoughtful article by Robert D. Kohn, a leading architect of New York city, urging the creation of a State building code, the need for which will be readily appreciated by anyone giving the subject intelligent attention.

Mr. Kohn properly states that unless certain fundamental building requirements, working for the safety of life and property, are broadly enforced, the laxity of one community in this respect might partly, if not wholly, nullify the ordinances of an immediately adjoining city or town, working thereby a hardship upon the more enlightened center. It is an axiom of law, as well as a declaration of common sense, that while an individual has the right to do as he sees fit with his own, he must not exercise such right to the detriment of his fellows—a condition that surely is created when a building is erected with little regard for its fire safety.

What is true of the individual is likewise true of the community; hence the entire reasonableness of Mr. Kohn's contention that a State law should be adopted and properly enforced.

It is not the thought that the enactment of a State regulation would dispense with the creation of local ordinances; for it is recognized that each community has its district building problems, which must be considered individually. But there are certain fundamental stipulations that are as applicable to Dunkirk, for example, as they are to Rochester, and it is these that should be covered by State regulation.

Again, if a city or town is so shortsighted regarding its immediate or future comfort and safety as to fail to adopt a modern building code, the State should exercise its police power and compel it to do so.

Another point brought out by Mr. Kohn, is the lack of intelligent enforcement of requirements in certain centers where these exist. It is superfluous to state that a law is desirable or the reverse, just in the degree to which it is intelligently administered; hence, coupled with the adoption of any law or set of laws provision should be made for their complete and intelligent enforcement.

In line with the thoughts expressed by Mr. Kohn, we draw especial attention to an article appearing on page 225 of this issue, dealing with the report of the Committee on Fire-Resistive Construction of the National Fire Protection Association, which was considered at the recent annual meeting of that organization held in Washington, D. C.

The report described deals with a fundamental question in construction of the highest importance, in that it explains a plan of classification of materials and of construction as well as a plan of grading completed buildings.

The primary thought is simply to use a yard stick to determine the fire-resistive values of different materials entering into construction by establishing a much wider range of fire test specifications than we have available at the present. In addition to this, uniformity is sought by establishing standard methods of testing, so that all tests wherever conducted may be entirely comparable.

Here then is one logical and simple means of enabling materials to be selected strictly on their ascertained merits in fire resistance. The adoption as a basic principle in a standard building code of classification of materials and completed structures would simplify the treatment of materials in such building codes and would greatly widen the use of materials of varying fire-resistive values, and at the same time open up to the builder a broader range of materials and types of construction, so that the economic question of the increased cost of better construction over inferior methods would in this manner be largely solved.

In other words, it is practically certain that a building code embracing these fundamental principles would secure in the community it served better constructed and safer buildings at little, if any, enhanced cost over easily combustible structures and, what is more important, would make the use of better buildings practically general.

## *Sensible Business Methods*

COMMENDATION is due the roofers of Detroit, who have associated themselves together in an effort to educate the building public of their city as to proper roofings and the numerous advantages to be derived therefrom.

Prominent, of course, among the arguments advanced for the adoption of sane roofs is their fire resistiveness—a feature the importance of which cannot be too strongly emphasized. A roof built of approved material will not only afford a high degree of protection against exterior fire, but will also tend to confine an interior blaze. For that reason this form of roof is of high value to the community, and its use should be compelled by municipal ordinance.

A campaign of fire-safety education, intelligently and intensively conducted, such as that recently inaugurated by the Detroit roofers, cannot fail to be of distinct benefit, not alone to those behind the movement, but to all who adopt the suggestions offered by the "men who know."

In the newer sections of Detroit are to be found block after block of frame houses, all having shingle roofs. These constitute a fire hazard the seriousness of which can not be overestimated.

# A Universal Standard Time-Temperature Curve and Its Use in Specifications for Fire Tests of Materials and Constructions

THE most significant and probably the most important proposal that has been advanced for many years to bring about standardization of fire tests was contained in the report of the Committee on Fire-Resistive Construction, presented at the recent annual meeting of the National Fire Protection Association in Washington.

This important committee has been striving to bring about logical system in the ascertained values and employment of structural materials in completed buildings.

A description of these efforts is contained in the preface to the committee's report presented at Washington, which is given below.

"The purpose of this committee is to present standard specifications for the construction of buildings of such varying degrees of fire resistance as modern engineering knowledge and experience indicate are necessary or permissible for the safety of life and property.

"The committee's report for 1913 gave specifications for the construction of a standard building designed for any occupancy.

"The 1914 report grouped fire-resistive materials and completed structures into three classes, designated as affording full protection, partial protection and temporary protection. It defined these in terms of test performance measured by time and temperature; and gave tentative test requirement specifications for various structural parts of a building. The report also classified buildings according to occupancy and gave recommendations regarding furniture and fixtures.

"The 1915 report continued this work by applying the principles of fire-resistive construction, previously established, to private residences and place of amusement. In this report the terms 'full,' 'partial,' and 'temporary protection,' were applied to completed structures, but criticism developed against such use of these terms and was met in the following year by restricting them to structural materials and parts of construction only.

"The 1916 report established three grades of construction for the classification of buildings as a whole in each of several occupancies; designating these as grades A, B and C, and illustrated their application to the 1915 Report on Private Residences.

"Grade A represents the highest practical type of fire-resistive construction for a building in any particular class. It is somewhat ideal, in that it restricts occupancy and is a better grade of building than those commonly erected. However, it is not inconsistent with good practice and represents the very best. Grade B covers the usual high-grade buildings which are found in many cities, and a certain latitude in the character of occupancy is allowed. Grade C applies to buildings having the poorest construction permissible and still entitled to recognition as fire-resistive. The 1916 report further contained specifications for the construction of an office building of Grade A.

"The report for this current year includes specifications for the construction of hotels, apartment hotels and club houses of Grade A, and for department stores of Grade A.

"The report also describes the work of a conference of technical organizations which has completely revised the recommendations of this committee for the year 1914 as related to classification of fire-resistive construction and test specifications. This revision greatly increases the scope and usefulness of these proposed standards for fire-resistance. An examination of this conference work will indicate the necessity of the revision of the reports of 1914, 1915 and 1916, and to the use of the terms classifying fire-resistive materials and construction and standard test specifications. The committee has scheduled this as part of the ensuing year's work."

The committee considered during its last year that the work on which it was engaged was of such far-reaching importance that it would be eminently desirable to bring into conference and consultation representatives from other important bodies in the country which were definitely interested in the subjects of standards and fire tests.

The recent report of the committee contains a description of these conferences and what was accomplished. The wording of the committee's own report on the matter is given herewith.

#### Classification of Fire-Resistance and Tentative Specifications for Standard Fire Tests

"The report of this committee for 1914 contained proposed standards of fire resistance as determined by tests, which were designated at 'full,' 'partial' and 'temporary protection,' and gave tables indicating the requirements of certain standard tests. Considerable criticism developed in regard to this portion of the committee's work; furthermore, the whole subject had been left in an indefinite condition and needed thorough reconsideration.

"The committee, realizing the immense importance of having these standards established as nearly as possible in harmony with the ideas of all investigators in this line of work, decided to attempt the assembly of a joint conference of as many technical bodies interested in the subject as possible. The co-operation of the committee on fireproofing of the American Society for Testing Materials was first secured, and these two committees invited assistance from other organizations. This effort was eminently successful and two such conferences have been held. The results are herewith presented as a part of this committee's report for consideration by the association. Similar reports will also be made to the other constituent members of the conference by the representatives who were present.

"The organizations represented at the conference were:

"Committee on Fire-Resistive Construction, N. F. P. A.

"Committee on Fireproofing, A. S. T. M.

"National Bureau of Standards.

"National Board of Fire Underwriters.

"Underwriters' Laboratories.

"Association Factory Mutual Fire Insurance Companies.

"American Society M. E.

"American Society C. E.

"Canadian Society C. E.

"American Concrete Institute.

"The membership of the two original committees, together with the representatives of the organizations named, formed a group of qualified technical experts which includes the majority of this class in the country.

"These conferences accomplished three important objects:

"1. An agreement with the principle adopted by this committee and endorsed by the association that fire-resisting materials and construction should be classified into three or more grades based upon the degree of protection which they would afford when measured by a fire test conducted in accordance with a standard time-temperature curve. For various reasons it was decided that the terms 'full,' partial' and 'temporary protection' previously recommended were unsatisfactory. In place of this plan to classify standards of fire-resistance by groups, the conference decided to adopt the terms 'four-hour protection,' 'two-hour protection,' 'one-hour protection,' etc. This classification harmonizes easily with the fire test work already done under the standard specifications of the American Society for Testing Materials by the Underwriters' Laboratories and other investigators. It is also evident that it will be a simple matter to interpolate other classes as they may become necessary.

"2. The adoption of a tentative standard time-temperature curve to control the conduct of the fire tests of materials and construction. The points on the curve which determine its character were selected by the conference and are indicated on the plot of the curve presented herewith. It was also decided that the temperature fixed by the curve shall be deemed to be the average temperature shown by the several thermocouples (not less than three distributed over the surface of the test sample) and situated at distances of 6 inches from the surface of the test sample.

"The conference members purpose to secure data from practical application of the curve to tests and later determine what changes, if any, may be desirable; also what the permissible temperature variations may be. When these have been decided upon, the curve will be presented to this association, and the other constituent organizations represented in the conference for adoption as a standard.

"The committee would be pleased to have investigators use the curve and offer remarks as to its suitability for the purpose intended. Any suggestions or criticisms will be welcome and should be sent to either the chairman or secretary of the committee.

"The conference further decided:

"That the fixed periods for standard fire tests on floors, columns, walls and roofs shall be established at 1, 2 and 4 hours, respectively.

"That the fixed periods for standard fire tests on partitions shall be established at 1, 2, 3 and 4 hours, respectively.

"That the fixed periods for standard fire tests on protection for wall openings shall be fixed at 1, 2 and 4 hours, respectively.

"That in partition tests the area of the test sample shall be not less than 100 square feet and no dimensions less than 9 feet.

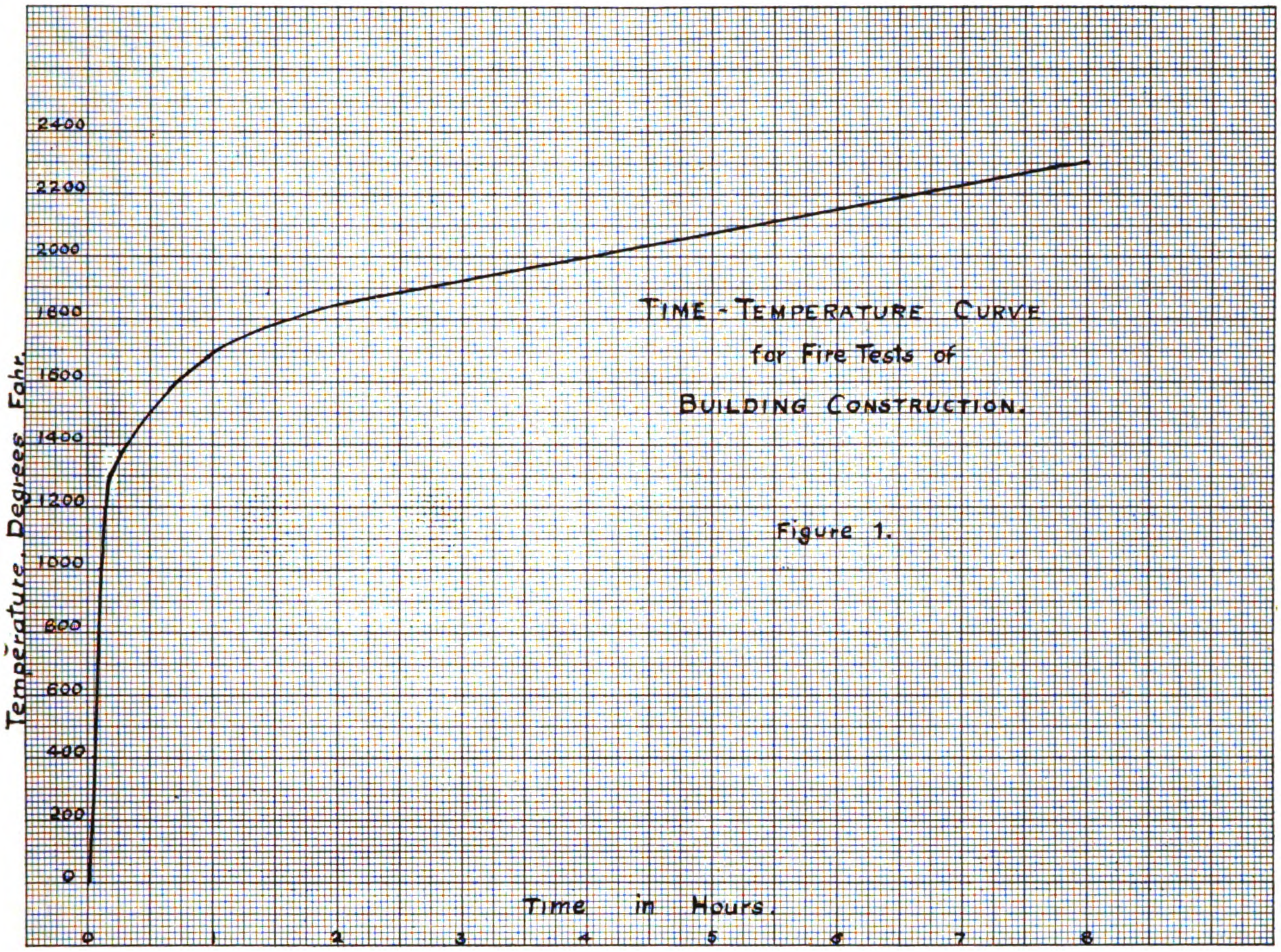
"That fire tests upon structural members or constructions shall include the application of a hose stream at the termination of the fire test.

"That the size of nozzle, water pressure and time of water application shall be as indicated in the following table:

| | Type of Protection, Hours | Size of Hose Nozzle, Inches | Water Pressure at Nozzle, Pounds | Time of Application, Minutes |
|---|---|---|---|---|
| Floors and roofs......... | 1 | 1⅛ | 50 | 2½ |
| | 2 | 1⅛ | 50 | 5 |
| | 4 | 1⅛ | 50 | 10 |
| Walls, columns and partitions .............. | 1 | 1⅛ | 30 | 2½ |
| | 2 | 1⅛ | 30 | 3 |
| | 3 | 1⅛ | 30 | 3 |
| | 4 | 1⅛ | 50 | 5 |

"That in 4-hour tests on floors and roofs the top of the test sample shall be flooded with water at low pressure for three minutes immediately after the expiration of the first five minutes' application to the underside. After the flooding the stream shall again be directed against the underside at full pressure for five minutes.

"In case of the 1- and 2-hour tests the flooding



shall be done after the full application of the hose stream to the underside of the sample.

"That in test on walls, columns and partitions the distance of the nozzle from the test sample during application of water shall be twenty feet when the hose stream is applied approximately normal to the surface of the test sample, and that when applied in the standard A. S. T. M. test house for partitions it shall be not more than two feet from the door.

"That floors shall carry during test a uniformly distributed load equal to that for which they are designed, and that after the fire the load shall be increased to four times the load carried during test.

### National Fire Protection Association

The National Fire Protection Association adopted the entire report of the Committee on Fire-Resistive Construction, including the foregoing as a tentative report, so as to enable this important subject to receive consideration and constructive criticisms and suggestions from all persons or institutions interested in the subject.

It will be observed that the action in bringing about conferences of representatives from such important bodies is a long step forward towards the desirable end of securing uniformity of practice in conducting fire tests.

"The conferences considered that the first basic principle in fire tests was securing, if possible, a standard time-temperature curve. We present to our readers a copy of the tentative standard time-temperature curve (Fig. 1) as recommended at the conference held on February 24, 1917, of representatives of the bodies named in the committees' report as quoted above."

This proposed standard time-temperature cuve was presented to, and adopted as tentative by, the National Fire Protection Association at Washington. It is desired that this curve shall be used by institutions or persons conducting tests, so that experience may be secured with its use.

It will be interesting to present (Fig. 11) some curves which have been used by different institutions. This is presented here as a matter of interest and to illustrate the actual need that exists for uniform practice in the application of heat in fire tests.

It will be noticed from the report quoted in this article that the conference tentatively adopted other fundamentals in the practice of conducting fire tests.

Using the standard time-temperature curve, it was decided that the 1-hour, 2-hour and 4-hour points of fire application should be used for fire tests of floors, columns, walls and roofs. Also that the 1-hour, 2-hour, 3-hour and 4-hour points on the curve should be used for the fire testing of partitions; and, further, that the 1-hour, 2-hour and 4-hour points should be used for the fire testing of protections for wall openings.

It will be seen that this has in effect established no less than 10 fire test specifications, whereas for some years we have had available only two standards tests, viz., one for floor construction and one for partition construction, established by the American Society for Testing Materials.

Other fundamental points which were decided upon by the conference were that the area of test sample in partition tests should not be less than 100 square feet, and that no linear dimensions in the test sample should be less than 9 feet, and the conditions of water application in respect to the size of nozzle, water pressure and time of water application were also adopted for the tests above referred to.

An important fundamental question also adopted, which is a sensible departure from the present practice in testing floors, was that in such tests, after the fire, the load should be increased to four times the load carried during the test. This means that if the floor is designed for 60 pounds only this load need be carried during the fire test, and that the load would be raised to 240 pounds per square foot after the fire application instead of the arbitrary initial load of 150 pounds per square foot and 600 pounds per square foot after the fire. It is contemplated, however, that the existing test specification of the American Society for Testing Materials employing these latter loads should be retained for the highest type of floors, so that the large number of tests of floors already conducted under these test specifications may be made available.

It is gratifying to be able to present to our readers information regarding this important—possibly the most important—step in progress which has been made in this subject for many years, and the Committee on Fire-Resistive Construction and the National Fire Protection Association are certainly to be congratulated upon their public-spirited work in this connection.

The absence of fire test specifications hitherto has prevented building code writers from incorporating therein measures of fire-resistive value on structural material, thereby excluding many admirable types of building. The adoption of a standard time-temperature cure is an epochal step forward in the establishment of fire test specifications. To a marked degree it will be serviceable in future code preparations.

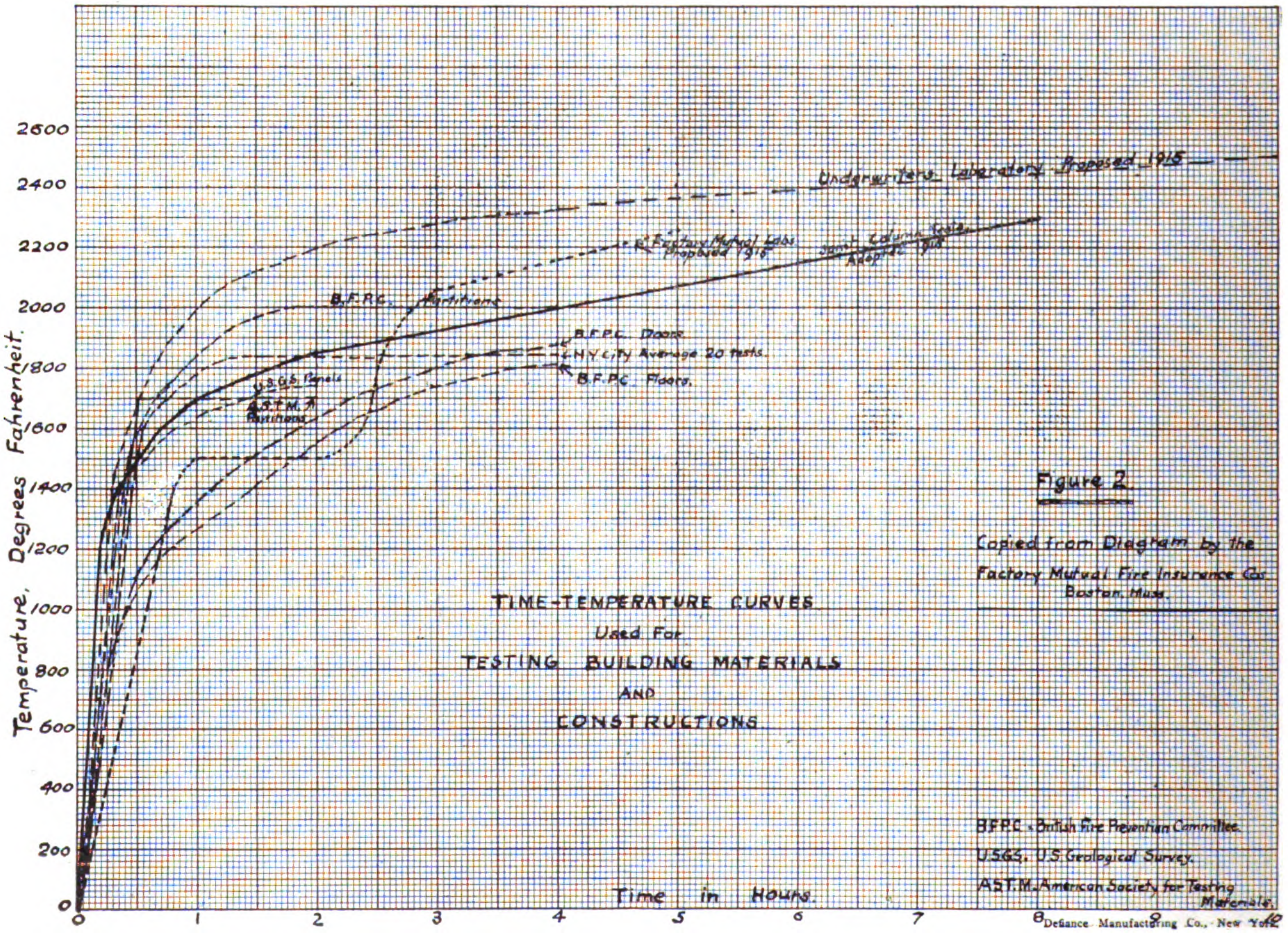


Figure 2.

# The Adoption of Proper Building Codes

By Robert D. Kohn, of New York City

FOR some time there has been a feeling among architects in New York that we need a basic building code to govern those parts of the State outside of the few large cities where adequate building codes are now in existence and enforced. Aside from the danger to human life outside the big cities through the absence, except in factories, of any protective legislation, this lack also is a handicap to building in the big cities. It is possible for a man to go right outside a city to build a very dangerous building without being subject to any restrictive legislation whatever; perhaps directly opposite on the same street with buildings erected within city limits under a highly detailed restrictive building code. While this was not a serious condition as long as the population of the State was mainly in small villages, suburban, rural and farming communities, it does become serious as the suburbs grow into metropolitan areas. Many parts of the country now being built up without the protection of a building code will sooner or later become incorporated into some city. Thus, as the population becomes more and more congested, this new city area will have for half a century at least the existing fire traps and life hazards of all kinds as an irremovble burden and danger.

### Defective Theater Construction

Not long ago plans for a theater to be built in one of the communities in the Mohawk Valley were presented in this city for the consideration of a mortgage. The examiner, in looking over these plans, was astonished at their deficiencies. The theater was to seat over two thousand people, yet there were few of those fire protection and lifesaving requirements which are included in every good building code. Indeed, the exits were quite inadequate and the construction defective.

The examiner for the lending company asked the architect what kind of a building code he was working under, and the reply was: "In our town we have only one provision of law which we must look out for. We are not allowed to build any encroachments upon the sidewalk"! Now this condition is absurd. Human life is no less to be protected in a small community than in a large one, and to put two thousand people in a theater in a small city without adequate and safe construction is even more risky than to do the same thing in a large city where a large fire department and the police at least afford help when a fire has broken out.

### Regulations Not Enforced

In addition to this lack of building regulations in the smaller cities it is evident to those who have looked into the matter that even in some of the larger cities of the State building codes are not enforced such as they are in this community. I talked not long since to an architect in one of the up-State cities—a city of considerable size—who told me that they had a building code, but it did not bother them very much. He said, "We do send our plans to the building inspector, but he has no sort of a staff to enforce them, and when he bothers us too much we tell him to beat it!"

### Seek Code for New York State

A Committee of the New York State Association of the American Institute of Architects has been working on this subject for some years, and this year, with the help of Mr. Bannister, of the Brooklyn Chapter, secured the introduction of a bill into both Houses of the State, Builders' Association and the Underwriters as well. This bill provided for the appointment by the Governor of an unpaid commission to study the desirability of a State Building Code and the preparation of such a code for submission to the Legislature if it was found that it was desirable. The commission was to consist of architects, engineers, builders and an attorney, all men of experience in their respective fields, and they were authorized to engage and pay additional experts. Members of the commission were not to be paid, but $20,000 was to be appropriated for their expense during the two years. This legislation specifically provided that the proposed State code in no way was to interfere with the adoption and enforcement of their own building codes by municipalities, provided that such local building codes afforded at least as adequate protection as the basic State code.

At a hearing held before a joint committee of the Senate and Assembly some months ago the proposed legislation met with no opposition. The only trouble was that an appropriation was asked for; and this year it was practically impossible to get money from the Legislature for anything that was not to the legislators absolutely imperative, and surely it was too much to expect to ask an average Assemblyman and Senator to consider as essential so abstract a thing as a building code. The bill died in committee. We have hopes that in another year we may be more successful.

### Ohio and Penna Codes Too Complex

What we are particularly anxious to get is a very basic code, one specifying the fundamentals to be secured in any building in the way of safety rather than the means by which these things are to be attained. In other words, we want to keep very far away from the sort of thing we find in the State Building Code of Ohio and a recently prepared draft of a

State Code in Pennsylvania. Both of these are so complex and so detailed that it is almost impossible to do anything at all without spending hours in investigation. Wisconsin has done better with its very simple requirements and has already attained valuable results, even for the farming communities. The Wisconsin Industrial Commission has been helpful in indicating the safe way to construct chimney flues, ordinary framing and other forms of building helpful to the farmer. Although there appear to be inadequate men for enforcing its provisions the mere existence of such a code is helpful to those who otherwise would have no guidance.

### Aiding the Farmers

Apparently, too, in that State, as well as in Minnesota, the Department of Agriculture, in co-operation with the local architects in their State Art Societies, have produced sets of plans of model farm houses which are distributed to the farmers at very small cost. These not only show attractive houses, but indicate how they may safely be built. All this sort of thing has yet to be done in this State.

### Looking to the Future

The movement for a State building code is the first step in the direction of providing against the time when large sections of our rural districts will be closely populated and hence need the protection of adequate and safe construction. It is very important that the architects of the State realize this situation. The time was when the architects left to others the preparation of building legislation and then spent their time afterwards in complaining about it. We have taken a new attitude in recent years. We ourselves should be the first to demand reform legislation and we should help in preparing it, since we have the experience and ought to know what a good building code really is. When we render that sort of service to our State, we architects are giving our best to Democracy and are in the way to become worthy citizens.

## Home Building at South Bethlehem, Pa.

AN initial order for the construction of fifteen hundred houses to be occupied by employees of the Bethlehem Steel Works at South Bethlehem, Pa., has been placed with the Thompson-Starrett Company of New York city. Work has already commenced upon the project, which it is expected will be completed on or about the first of the new year.

The present construction will likely be the forerunner of additional work of like character, the rapid expansion of the steel plant requiring the services of men far in excess of present facilities for their housing.

## Industrial Building Construction

THE present trend of industrial building construction is indicated by a recent investigation made by President W. P. Anderson of the Ferro Concrete Construction Company, Cincinnati, and presented in a paper read before the recent annual meeting of the American Concrete Institute in Chicago, says *Building Age*. The results of Mr. Anderson's investigation were drawn from inquiries made of the leading industries, manufacturers of all classes of metal goods, brewers, makers of textiles, paper, leather, boots and shoes.

Of the representative manufacturers who were requested to furnish data 370 concerns contributed information covering 1,230 buildings erected during the period covered by the investigation. These varied greatly in size, use and construction, but all were used for industrial purposes.

The returns, year by year, are graphically represented in a chart accompanying the paper and covering the four major classifications—all wood, brick walls (steel frame), mill construction, concrete construction. Of course, the abnormal disturbances during 1914-1916 account for the great fluctuations in that period. But even up to and including 1913, the advance of concrete construction and the relative decadence of other types are distinctly noticeable. The comparative growth of the various types of building construction is most strikingly shown by comparing the periods 1905-1910 and 1911-1916. In the former the returns cover 7,014,218 square feet of mill construction and only 5,512,579 square feet of concrete construction, but in the later period the area of concrete construction jumped 327 per cent, to 16,926,152 square feet, while the mill construction showed a bare increase of about 10 per cent to 7,709,469 square feet. The estimated area for 1916 was used in making up the comparisons.

## Fireproof Warehouse at Los Angeles

PLANS are well under way for the construction of a five-story fireproof warehouse at Los Angeles, Cal., for the Panama-Pacific Warehouse Corporation. The structure will cost about $350,000, with an additional $82,000 for equipment.

FOLLOWING an exhaustive study into the industrial housing problem by the Housing Committee of the Lockport (N. Y.) Board of Commerce, the Lockport Homes Company has been incorporated, with a subscribed capital of $100,000. The aim of the new organization will be to construct modern homes of comfortable and attractive design which can be sold or rented to workingmen at modest prices.

# *Roof Openings and Cornices*

APPRECIATING the importance from a fire-resistive standpoint of properly protecting roof openings and cornices, both from internal and external exposures, the advance report of the committee of the National Fire Protection Association dealing with the general subject was given most attentive study at the recently held gathering of the Association at Washington, D. C.

From the report we quote the following:

### Skylights

By the term skylights as considered in these rules is meant any opening through roof of building for the admission of light.

The following types with their modifications and combinations are noted: Flat skylights, plane or inclined; peaked skylights; cupola skylights; monitors and lanterns; saw-toothed roofs; raised sections of roofs with vertical sash; ventilating skylights; dormers, etc.; also special skylights as over stair, elevator or dumbwaiter shafts, and over stage portions of theaters.

### Sash Construction

Sash to be constructed entirely of metal, either galvanized iron, copper, wrought iron or angle iron.

To be constructed with soldered interlocking seams or rivets in accordance with the rules and requirements of the National Board of Fire Underwriters for wired glass windows.

Glass to be secured to the sash by means of metal strips held in position by bolts or screws in such a manner as to form joints sufficiently elastic to allow for proper expansion and contraction, and to be weatherproof.

### Glass

(a) For plane skylights or such as are inclined less than 80 degrees to the horizontal, except as noted under (c) and (d), standard wire glass not less than ¼ inch-thick or ½-inch plate glass protected with approved wire screens shall be used. The panes to be not over 18 inches wide and not to exceed 1,728 square inches in area. Panes exceeding 48 inches in length shall be supported midway between the ends by a rigid member of the sash.

(b) For skylights inclined at an angle of 80 degrees or more to the horizontal, glass not less than 3/16-inch thick may be used, provided it is protected with approved wire screens.

Where such skylights are subject to exterior exposure standard wired glass not less than ¼ inch thick shall be used. For such sash the unsupported surface of the glass shall not be more than 48 inches in either dimension or exceed 720 square inches in area.

(c) For skylights over stair, dumbwaiter, air or similar shafts, glass 3/16-inch thick shall be used, not over 18 inches wide, not more than 720 square inches in area, protected with approved wire screens.

(d) For skylights over stage sections of theatres not over 1/12-inch glass, protected by suitable screens.

NOTE.—Substitutes for glass, such as wire cloth with a coating of translucent, combustible substance or similar material, are not approved.

### Frames

Frames for low, flat or small cupola skylights to be entirely of galvanized iron secured to angle irons, all properly riveted together and securely fastened to roof. All joints to be tight and weatherproof.

### Curbs for Skylights

(a) If on buildings of fire-resistive construction, to be constructed of approved fire-resistive materials reenforced with angle iron properly protected by approved fire-resistive material.

(b) If on buildings of slow-burning construction, may be either (1) of not less than 4 x 4-inch framework, filled in with brick, terra cotta, cement or other approved fire-resistive materials, tin-clad on the outside; (2) double boarded, tongued and grooved, boards at right angles to each other, tin-clad on the outside.

(c) On all other buildings, if not in accordance with the foregoing to be thoroughly tin-clad on the outside.

### Monitor or Lantern Skylights

(a) Construction. To conform in general with roof construction of buildings of which they form a part, and as specifically noted under curbs, section 4, class A.

(b) Sash. To conform in all particulars to sections 1 and 2, class A.

(c) Frames. (1) If for skylights on tops of monitors or lanterns to conform with section 3, class A. (2) If in sides of monitors or lanterns of fireproof construction to be constructed in accordance with the rules and requirements of the National Board of Fire Underwriters for Wired Glass Windows. (3) For all monitors or lanterns where woodwork is permissible, see under (a), this section, the frames, if of wood, including the rabbets, if any, or recessed portions receiving the sash must be thoroughly protected by galvanized iron or copper.

### Saw-Toothed Skylights

(a) Construction. To conform in general with roof construction of buildings of which they form a part, and as specifically noted under curbs, section 4, class A.

(b) Sash. To conform in all particulars with sections 1 and 2, class A.

NOTE.—Usually this type of skylight is one continuous frame. The muntins or rails must conform in manner of construction and securing to the requirements of the National Board of Fire Underwriters for the construction of frames for wired glass. Any deviations from this arrangement will be governed by the rules or requirements of the types or kinds under which they may come.

### Vertical Sash Under Raised Sections of Roofs

This includes also a row of sash or sections of wall entirely of glass, above the wall proper and underneath the roof.

Must conform in general with the rules and requirements noted under sections 5 and 6, class A, in so far as these apply.

### Ventilating Skylights or Skylight Sash

Frequently portions of skylights (sometimes the entire sash) are arranged that they may be opened for purposes of ventilation. Such sash are usually secured by hinges, trunnions or pivots.

(a) Hinged and Pivoted Sash. To be provided with hardware and hung and arranged in such a manner as to conform to the rules and requirements of the National Board of Fire Underwriters for the construction of frames for wired glass.

(b) Protection. All ventilating skylights or skylight sash must be protected by wire cloth screens as specified, in such a manner that the screen will allow full freedom of operation. In no case must the operation of the sash require the removal of the screen or any portion of same. The screens should be entirely independent of this type of skylight or sash and shall be of ample size to completely protect the opening.

### Windows in Roof Structures

All window openings in roof structures, such as shafts extending above roofs, pent houses, high curbs, ends of saw-toothed or monitor or lantern skylights, etc., must conform to sections 1, 2 and 5, class A, in so far as these apply.

### Dormer Windows

(a) Construction. To conform in general with roof construction of buildings of which they form a part, and as specifically noted under curbs, section 4, class A.

(b) Sash and Frames. To conform in all particulars to sections 1 and 2 and section 5, class A, respectively, in so far as these apply.

### Skylights over Stair, Elevator, Dumbwaiter, Light, Air

and similar shafts, if of fire-resistive construction and cut off at floors.

(a) Construction. To be constructed with metal frames and sash in accordance with sections 1 and 3, class A.

(b) Glazing. To be glazed with glass 3/16-inch thick; protected by suitable wire screens. Glazing to be done in accordance with section 1, class a.

(c) Ventilation. Where ridge ventilators, or louvers in ends or sides of such skylights are provided, these must be protected by suitable wire cloth screens, properly secured.

### Theater Stage Skylights

(a) Construction. Curb or frame, and sash to be constructed in accordance with the rules and requirements of sections 2, 3 and 4, class A.

(b) Glazing. To be glazed with glass not over 1/12-inch thick, in accordance with section 2, class A, each plane measuring not less than 300 square inches.

(c) Operating. Sash to be in two movable sections, so arranged as to be opened readily by the action of heat from below on a fusible link or series of links; or similar device, which upon parting will allow the sash to open automatically, and also by means of the cutting of a hempen cord, extending to the stage floor and within reach of fly gallery.

(d) Types. Two types of skylights for this purpose are suggested. (1) Two counterbalanced sash, hinged to the outer edges of the curbing or frame, which should be slightly hip-shaped, the upper edges coming together when the sash are closed, and arranged in such a manner that one is provided with an overhanging lip or batten to keep out the weather. Each sash to have extension rods or bars at the lower (hinged) edge, projecting beyond the curb for a distance not less than the width of the sash, to which bars should be securely attached a weight not less than 50 per cent heavier than the weight of the sash. Hinges to be of heavy brass, bolted to the sash and curb or frame, and set well back from the edges of the frame. (2) Two rolling sash, fitted with brass wheels not less than 2½ inches in diameter, set inside of outer edge of sash for a distance of not less than 2 inches, well secured to sash. The wheels to roll on brass tracks properly secured to the curb or frame and rails extending beyond same on either side to roof. Curb or frame to be hip-shaped, the slopes to be such that the sash shall be inclined at not less than an angle of 30 degrees. The height of the curb or frame shall be such that the lowest portion of the tracks on which the sash slide, shall not be less than 12 inches above the roof.

(e) Protection. Either type of skylight for this purpose shall be protected by suitable steel wire cloth, properly secured in such a manner as not to interfere with the operation of the sash and of sufficient size to cover the entire opening properly, as well as to protect the sash when open.

#### Protection

All skylights (except those glazed with standard wired glass) shall be protected with screens of galvanized wire cloth.

#### Wire Cloth

(a) Kind. All wire cloth shall be woven (not twisted) of steel or iron wire galvanized after the weaving. Cloth to be of not lighter than No. 12 U. S. gauge wire, and not less than ¾-inch mess and not over 1-inch mesh shall be used.

#### Fastening

(b) All wire cloth shall be securely fastened by means of galvanized iron wire or by means of special metal strips and rivets, bolts or screws.

#### Frames

(a) Materials. Frames for wire cloth screens shall be constructed of iron rods, pipes or angles as follows: (1) For screens not over 3 feet in any direction, ⅜-inch rods, ⅜-inch pipe or ¾-inch angles. (2) For screens over 3 feet and under 4 feet in any direction, ½-inch rods, ½-inch pipe or 1-inch angles. (3) For screens over 4 feet and under 6 feet in any direction, ⅝-inch rods, ¾-inch pipe or 1¼-inch angles. (4) For screens over 6 feet and under 10 feet in any direction, 1-inch rods, 1¼-inch pipes or 1½-inch angles. (5) For screens of larger sizes, proportionally larger-sized material shall be used, in which case angles are to be preferred.

(b) Re-enforcing. Where dimensions exceed 3 feet in any direction, cross bars, placed not over 3 feet apart, or over 3 feet distant from outer bars, shall be provided for re-enforcing the frames. These re-enforcing bars shall conform in size to the rods, pipes or angles under (a), this section, increasing in size as noted, according to span.

(c) Supports. Upright supports, to correspond with materials specified under (a), this section, and at end of each re-enforcing member, and to be not less in size than the bars supported.

(d) Braces. All enclosing frames over 3 feet high and more than 6 feet in length shall have braces extending from the upper angles to the base line, one in each corner of each side.

(e) Construction. The frames should be strongly assembled. (1) If constructed of rods these should be welded together, or threaded and securely joined by threaded malleable iron fittings, and upright members shall be properly shaped at lower ends to permit fastening by means of screws; or if size permits, to be threaded and provided with threaded malleable iron base or foot plates drilled for three bolts or screws each. (2) If constructed of pipes, these should be threaded and secured by means of threaded malleable iron fittings, and upright members shall be so shaped or flattened and drilled as to permit securing them by means of screws or bolts, or be threaded and provided with threaded malleable iron base or foot plates, drilled for three bolts or screws each. (3) If constructed of angle irons, these should be welded together or fastened at the corners by fillet angles or gusset plates securely riveted in place. Upright members shall be shaped at base to permit fastening by at least two screws or bolts each.

(f) Securing Frames. All frames for screens to be secured to roofs or frames of permanent skylights, monitors, lanterns, etc., by means of lag screws or bolts.

#### Distance of Screens from Skylights, Etc., to Be Protected

(a) All screens shall be placed not less than 4 inches nor more than 10 inches above skylights to be protected, and shall project the same distance beyond the edges of the skylights as raised above them.

(b) All screen used for protecting side lights shall be placed not less than 6 inches from lights or openings so protected.

(c) Screens for skylights inclined at an angle of over 45 degrees shall be turned in at the top and sides in such a manner as to exclude embers or sparks from the space between the screens and the glass.

(d) When any such skylight is located over any passageway or any room or public resort, a similar screen shall be placed below the skylight.

#### Removable Screens

Where for any purpose it becomes necessary that screens used in protecting side lights must be removable, these screens or portions of screens shall be framed as specified under section 15, and similarly constructed frames placed around such openings. Such screens or sections of screens shall be secured to the permanent frame by means of riveted wrought iron hinges and be provided with strong wrought iron latches, bolts or hooks.

#### Ventilators

By ventilators, as considered in these rules, are meant all structures designed for the emission of air, gases or vapors from the building, separate rooms or compartments, and include flues, louvers or ridge ventilators, ventilating monitors and general frame ventilating structures.

#### Flues

To be constructed entirely of galvanized iron at least No. 24 gauge, copper at least No. 20 gauge, or of other approved fire-resistive materials.

They should be provided either with cowls or hoods projecting the same distance beyond outer edge of flue that they are raised above same, but in no instance less than 3 inches, and opening must be protected with a screen of galvanized steel wire cloth, of not less than No. 16 U. S. gauge wire or more than ⅜-inch mesh, properly secured and completely covering the opening; or so constructed, or provided with baffle plates, as to prevent the entry of sparks.

### Louvers or Ridge Ventilators

To be constructed entirely of galvanized iron of at least No. 24 gauge or copper at least 20 gauge, as specified under section 3, class A. Slats to be of galvanized iron or copper as specified, properly re-enforced, and riveted to the frames. All such ventilating openings shall be protected with a screen of galvanized steel wire cloth, of not less than No. 16 U. S. gauge wire or more than ⅜-inch mesh, properly secured to the frames and completely covering the openings or shall be so constructed as to prevent the entry of sparks.

### Ventilating Monitors

or similar structures to conform in general with roof construction of buildings of which they form a part, and as specifically noted under section 4, class A. Ventilating slats to be of galvanized iron or copper, as specified, properly re-enforced and riveted to frames. All such ventilating openings to be protected by galvanized steel wire cloth, of not less than No. 16 U. S. gauge wire or more than ⅜-inch mesh, properly secured and completely covering the openings.

### Frame Ventilating Structures

Shall be protected by galvanized steel wire cloth of not less than No. 16 U. S. gauge wire or more than ⅜-inch mess, properly secured and completely covering the opening.

### Door Landings, Pent Houses or Bulkheads

(a) On all buildings of fire-resistive construction to be constructed of approved fire-resistive materials properly re-enforced when necessary. Doors to be standard. Windows to be of standard wired glass, in standard metal frames.

(b) On buildings of slow-burning construction may be either (1) of not less than 4 x 4-inch framework, filled in with brick, terra cotta, cement or other approved fire-resistive materials, tin-clad on the outside; (2) double boarded, tongued and grooved, boards at right angles to each other, tin-clad on the outside; (3) of not less than 2¾-inch tongued and grooved, or splined plank, tin-clad on the outside. Doors to be double battened, tin-clad on the outside, with tinning re-turned over the edges. Windows to be of standard wired glass in standard metal frames.

(c) On all other buildings, if not in accordance with the foregoing, and of frame, to be thoroughly tin-clad on the outside. Doors to be tin-clad on the outside and windows if not of wired glass to be protected by wire cloth of No. 12 U. S. gauge and not less than ¾-inch or more than 1-inch mesh.

### Scuttles

(a) If on buildings of fire-resistive construction to be of (1) not less than No. 12 gauge sheet iron or steel, re-enforced by not less than 2 x 2 x ¼-inch angle iron, or (2) double battened wood with approved metal covering on all sides, and in all angles, and be provided with proper chafing plates where fitting over combing.

(b) If on buildings of slow-burning construction to be as noted under (a), this section, or of double battened wood, tin-clad on the outside, the tinning to return over the lower edges.

(c) On other buildings, if not in accordance with the foregoing, to be thoroughly tin-clad on the outside, the tinning to return over the lower edges.

### Fastening

All scuttles are to be fastened by means of strong steel or wrought iron, galvanized hinges, bolted to scuttle and combing or roof.

### Stops and Opening Devices

All scuttles to be provided with suitable stops, bolted to scuttle and combing, allowing the scuttle to open slightly beyond a vertical position, and devices to permit easy opening.

### Access

Stairs or permanent ladders with hand rails should be provided, giving ready access to the scuttles.

## *Dangerous Optimism*

THE young and inexperienced contractor is very likely to think that if he can figure a profit of 15 per cent above the cost of all labor and material he is very safe and prosperous, says *Contracting*. Perhaps he will make money on some contracts with this margin, but the time will surely come when accident, delayed payment, strikes, a rise in prices and various contingencies will wipe out all the margin and far more, and lucky he is if it does not entirely ruin him. This is particularly the case with a capable foreman accustomed only to earning wages, but who knows the cost of labor and material. A small profit looks relatively large to him and he is prone to invest his savings in a contract taken far below the proper price. If he can carry through at all he may feel that he has made money because by working twice as hard as usual he has secured fair or even extra wages, although in reality he has been up against a losing proposition. Such men perennially replacing those that have failed pour out year after year their capital on the altar of low contract prices and serve to perpetually keep prices below their proper level and maintain an unhealthy competition.

*A Department Devoted to the Use of*

# AUTOMATIC SPRINKLERS

*Edited*

**IRA G. HOAGLAND, Secretary** **PAUL MASON, Special Representative**

*National Automatic Sprinkler Association*

## *Automatic Sprinklers for Seaboard Terminals and Shipbuilding Plants*

FIRE protection for wharf and shipyard properties involves so many problems of (first) construction, arrangement and maintenance, and (second) hazards (variable) and protection (relatively fixed) that a cursory sketch can do no more than summarize the major factors—bring out the high lights, as it were—and must ignore many items that, unimportant of themselves, nevertheless in the aggregate go far to swell the total. They correspond, in a measure, to the "basic rate" of the fire insurance schedule, being the largely unidentified and irreducible factors in the equation.

Under this subject must also be classified waterfront terminal warehouses and ships alongside, and dry docks with ships therein. But ships may well be treated separately; so these notes will touch on wharves, their sheds and warehouses, shipyards and their buildings—the permanent, rather than the shifting features of the plants and their activities.

### Pier and Warehouse Construction

Construction is an important element of pier, warehouse and shipyard safety, but chiefly as a factor in protection against exposure. Certainly the wharves themselves, with their piling or other supports, should be of concrete. There is danger in all ports, and especially ports which are shipping centers for the oil industry, of accidents (collisions, etc.) that may, and often do, result in oil fires that spread over the surface of the water and attack wood piling, timbers and floors from beneath, where neither hose streams nor rain from automatic sprinklers can reach the blaze. Seattle, Wash., has had at least one experience of this kind that might easily have caused a general waterfront conflagration.

### Safeguarding Contents

But with respect to the superstructures, it is to be remembered that high values and highly combustible contents often go together, and, while it is very desirable that buildings be as nearly fire resistant as possible, for protection against spreading fires (exposure), it is even more important that automatic means be provided for catching a blaze among the contents in its incipiency, and while it sets to work at once to extinguish it, automatically and instantaneously transmits an alarm and calls for outside help. This is even more important in these present war times, marked by incendiary attacks on food supplies, munitions and shipping facilities, than it was in "piping times of peace." Then it was merely a drain—albeit of great magnitude—on the created and creative wealth of the country. Now the life of the nation may hang in the balance, dependent on the means taken to protect these vital factors in the successful conduct of the war.

Fires in wharf properties, usually piled high with combustibles, spread with great rapidity, unless there are (first) fire stops or other factors of construction to form barriers against spread of the flames, and (second) automatic sprinklers to catch the blaze in its incipiency.

### $3,000,000 Fire at Baltimore

As an example of rapidity of the spread of fire in such a property, the writer recalls a wharf fire in Baltimore in 1893. It was a hot August afternoon; the pier, of wood on wood pilings, with corrugated iron roofing on wood supports, was packed with cotton, jute, hemp, dry salt pork, bacon, lard, whiskey, alcohol, spirits turpentine, raw turpentine, rosin and many other hazardous articles. Fire broke out at 1 :25 in the afternoon, and before 6 o'clock the last editions of the evening papers had gone to press with complete stories of the fire, chronicling a loss approximating three millions, which included, besides the wharf property and contents, destruction or damage of several vessels, one of which was a Bay Line steamer, another a large schooner.

### Weaknesses of Combustible Construction

There was a fire in a pier at Seattle, Wash., June 30, 1916, that illustrated all the weaknesses of combustible construction, as well as the fallacy of permitting structures of this kind to stand unprotected. The wharf, with wood floor on wood piling, carried light frame buildings and was used by the Government in its army transport service. The U. S. S. Burnside was tied up there, and the fire was discovered late at night by an officer of the ship returning from shore leave. The buildings were fairly well filled with hay, feed, building material, army stores, officers' baggage, etc., besides a large quantity of fixed ammunition—6- and 8-inch shells. The Burnside had steam on one boiler and was saved, but not before one entire side was blistered and her upper works badly damaged.

Before the fireboat and the land forces of the department could get to work the entire pier was ablaze. Explosions of ammunition interfered with their work and the property was destroyed.

### Comment of Fire Marshal

Fire Marshal Henry W. Bringhurst, reporting on the blaze a few days later, had this to say:

"The lesson of this and three or four other fires of the same sort is that there can be no safety until such buildings have better provisions for checking fires, as well as for extinguishing it. * * * Two or three heavy plank or cribwork partitions, properly constructed, would have retarded the spread of the fire and enabled the firemen to keep it out of the ammunition; *with a sprinkler system it would have been held in the original section.*"

Construction of wharf and shipyard properties should be sound; not necessarily incombustible, but there is no place in properties of this kind for flimsy construction and hazardous building methods. Piling certainly should be of concrete, and flooring preferably of concrete, although heavy plank flooring, properly supported and laid, is by no means hazardous. Buildings should range from real mill construction to the highest grade of fire resistant structures, with areas circumscribed, as far as possible, by fire walls with standard fire doors.

### How Bush Terminals Are Built

It is interesting to note in this connection that the great Bush terminals at New York—the largest dock terminals of their kind in the world—by no means depend on "fireproof" construction for safety. Two years ago in this terminal fire broke out in 12,000 bales of cotton in the warehouse on Pier 1. The building is 1,324 feet long, 150 feet wide, and is built of steel and wood, with unprotected steel columns and trusses supporting a roof of light planks on small timbers rather closely spaced.

But—all the Bush terminal buildings, piers, etc., are completely sprinklered. So when the fire came the blaze flashed over the pile of cotton, 64 sprinkler heads opened, and in 50 minutes the blaze was out, with no damage to the building and only 1,018 out of 12,000 bales were damaged, with salvage of 80 per cent.

District Chief Langan, who had charge for the fire department, declared: "If there had been no sprinklers we would not have had a chance on the pier."

Consider this in light of the fact that there was no damage to the pier itself.

### Popularity of Sprinkler Equipment

Fully seventy individual wharf properties in the United States are sprinklered, and many more dock storehouses. The greatest number of sprinklered wharves in one group are the seven at the Bush Terminal, which also includes 110 sprinklered warehouses. About two-thirds of these wharves are on the Atlantic coast, and the remainder, except a few in the interior, on the Pacific coast. Nearly 60 per cent of the Atlantic coast installations are in the port of New York. Ports having two or more sprinklered wharves are: New York, 26; Seattle, 8; Boston, 6; Los Angeles, 5; Philadelphia, 3; Norfolk, 3; San Francisco, 2; Portland, Ore., 2; Tacoma, Wash., 2.

This is not the only serious fire in the Bush terminals since sprinklers were installed in 1906. In June, 1915, fire in 5,280 bales of cotton resulted in opening 119 heads, which controlled the blaze in 10 minutes. There have been 10 fires in the piers proper, all controlled by sprinklers, in 11 years, and in the same time more than 100 fires in the shore properties—loft factories, warehouses, etc.—of the terminal, extinguished by the sprinklers with an aggregate loss of less than $300. The average loss in unsprinklered industrial and mercantile properties is $25,000.

The Commonwealth pier at South Boston and the State pier at Providence, R. I., are other noteworthy examples of sprinklered pier properties. The Commonwealth pier is 1,200 feet long and 400 feet wide. Construction is largely concrete and steel, but the roof, of monitor type, is of heavy plank on steel, and there are many partitions and other combustible features in the construction of the passenger department on the second floor, besides the usual highly combustible contents, in the way of freight, on the wharf level.

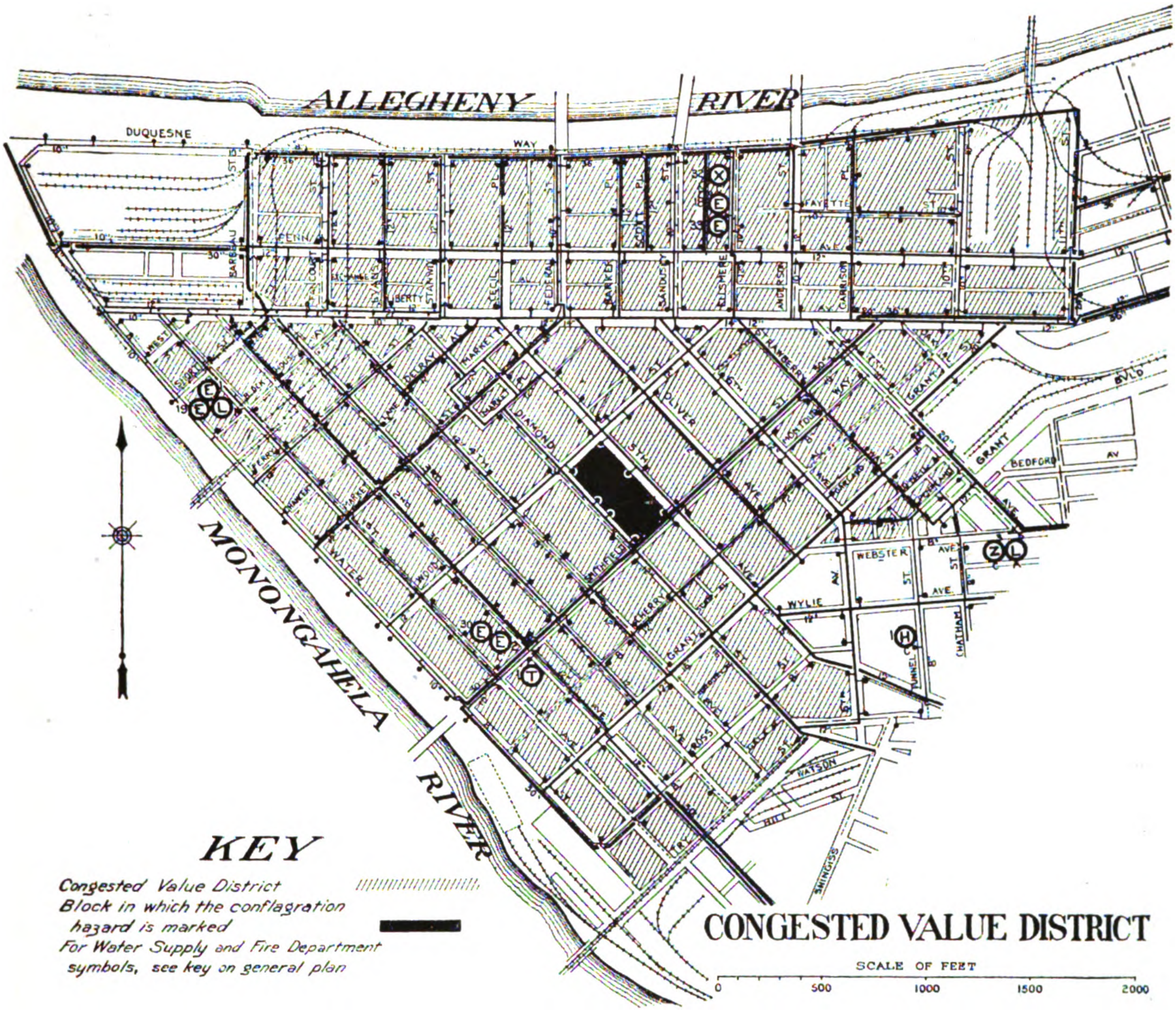
The State pier at Providence is similarly protected. Buildings are concrete, brick and steel, with the main part of the building exceedingly high in one story, and high mezzanine levels on both sides. Neither of these properties has had occasion to test out the efficacy of its sprinklers, designed to protect the contents, while safety of the buildings themselves, their protection against exposure, is dependent on their excellent fire-resistant construction.

Properties in the various classes thus protected include 44 dock and warehouse properties, among which is one recreation pier, at least 19 railroad seaboard terminals and 11 or 12 shipbuilding plants.

This record is not complete, but it is a fair indication

(*Continued on page 244*)

# *Pittsburgh's Worst Conflagration*


ALLEGHENY RIVER
DUQUESNE WAY
MONONGAHELA RIVER
KEY
Congested Value District ////////////////////
Block in which the conflagration hazard is marked
For Water Supply and Fire Department symbols, see key on general plan
CONGESTED VALUE DISTRICT
SCALE OF FEET
0
500
1000
1500
2000

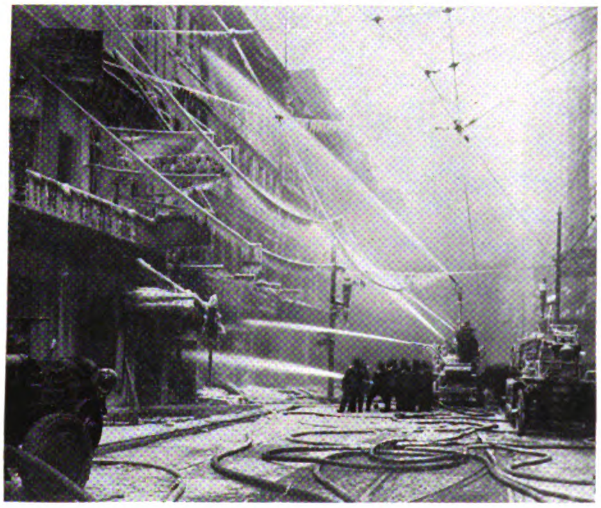
This map is reproduced from the report on Pittsburg fire hazard made by the committee on fire prevention of the National Board of Fire Underwriters on July 13, 1915, a year and a half before the big fire of January 27 last broke out in the square the committee indicated, by making it appear all black, as the worst danger section in all Pittsburg, should a fire break out. The warnings sounded by the committee went unheeded. The city authorities paid no attention to any of the recommendations made. At that time the Bureau of Fire was described as "fairly strong, but inefficient, due to politics and lack of training and minor equipment; two-platoon system ordered, at a probable sacrifice of company strength and local protection." The two-platoon system is now an actuality; the prophecy of the committee is proved true. If anything, the bureau is more faulty and demoralized now than it was when the report was made, a year and a half ago. And yet Mayor Armstrong in his public talks prates about Pittsburg having the finest fire department of any city in the country!—*Pittsburg Dispatch*, Feb. 18, 1917.

WHEN on January 27th last the worst fire in the history of Pittsburgh, Pa., visited the city, destroying an entire business block and causing direct property loss of close to $2,500,000, the citizens of the community, and more especially its responsible public officials, could not say they had not been fairly warned of the threatened danger. Instead, the menace had been specifically and very emphatically pointed out by engineers of the National Board of Fire Underwriters some eighteen months previous. Their timely and disinterested warnings, however, were ignored by the powers-that-be, who contended that the underwriters were mere alarmists and that Pittsburgh had a fire department that would be able to cope with any fire danger that might arise.

The utter folly of the self-sufficient attitude of the ruling officials was demonstrated by the conflagration early in the year, particulars of which are set forth in the following text supplied by the National Fire Protection Association. The accompanying illustrations are used by courtesy of *Insurance World*, of Pittsburgh.

The buildings which on 27th January, 1917, were ruined by fire in the heart of Pittsburgh's congested high value district comprised five sections, which may for convenience be labeled A, B, C, D and E.

Section A.—Nos. 330-340 Fifth Avenue consisted of a four-story and basement fire-resistive building. Although this was protected on one side by wired glass windows in metal frames which overlooked an adjoining structure, there were at the rear large unprotected openings in the basement and first floor and unprotected openings of ordinary size on the second and third floors. There was an open stairway from the basement to the fourth floor. This section, which covered an area of 9,430 square feet, was used on the three upper floors for billiard and pool rooms and bowling alleys. On the first floor were the Lyric Moving Picture Theater, the lobby to the Grand Opera House and a dining room.



Looking down Fifth Avenue from corner of Smithfield Street

Section B.—Nos. 342-354 Fifth Avenue and 339-343 Diamond Street consisted of a three- and four-story and basement ordinary brick and wood joisted building. The front and rear walls were of wood and glass. The former partition and division walls had been removed and the floor loads were carried on unprotected steel columns and girders. The two elevator shafts were enclosed, but there were two open stairways at the front, one from the basement to the fourth floor, the other between the basement and first floor. At the rear there were three stairways, one of which was open. The open stairway rose from the basement, in which the fire occurred. The basement and first floor were occupied partly by the J. G. McCrory & Co. Five and Ten Cent Store, and partly by the Frank & Seder Store. The floors above were occupied mainly by Frank & Sedar. This section covered an area of 19,350 square feet.

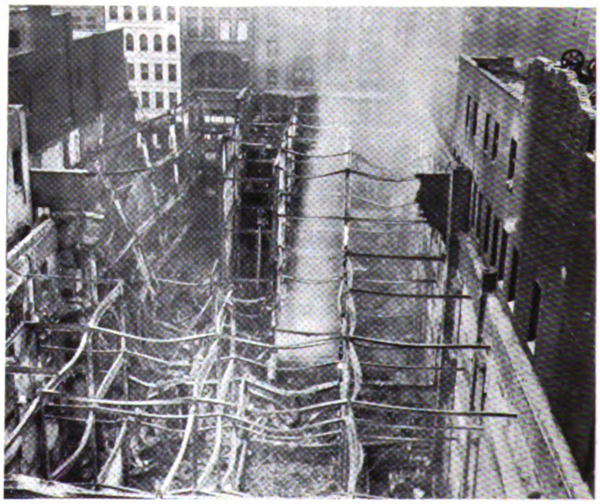
Section C.—445-447-449 Smithfield Street consisted of a four-story ordinary brick and wood joisted building with unprotected steel columns and girders. The two principal stairways were enclosed, but there were open stairways between the first and second floors and the basement and first floor. The side walls were protected by standard fire doors on the third and fourth floors, but the windows into the brick light area in the rear were unprotected. This section was occupied by several mercantile establishments and covered an area of 3,600 square feet.

Section D.—429-441 Smithfield Street comprised a four- and five-story ordinary brick and wood joisted building. The former partition and division wall had been removed and the floor load was carried on cast iron columns and steel girders. The two elevator shafts were enclosed, but there were adjoining open stairways. Frank & Sedar occupied the greater part of this section. The area of the section was 8,700 square feet.

Section E.—327-335 Diamond Street comprised a two-equal-to-four-story ordinary brick and wood joisted building with heavy metal and wood cornice on all sides. The main floor was occupied by the Grand Opera House and stage, used as a motion picture house at the time of the fire. Section E covered an area of 11,250 square feet.

### Story of the Fire

The fire was discovered at 1:57 A. M. in Section B by the watchman of the McCrory Store. On passing the stairway leading up from the basement near the cashier's desk, he discovered smoke and immediately turned in an alarm. Two minutes later a policeman outside also turned in an alarm. In addition to the watchman's A. D. T. alarm and four ordinary alarms, three special alarms were found necessary, the last of these being transmitted at 4.34 A. M. The basement



Beams and girders bent and twisted by flames

Ruins of Frank & Seder store from corner of Diamond Street

in which the fire originated contained a large quantity of highly inflammable packing material belonging to the McCrory Store, which facilitated the rapid lateral spread of the conflagration, while at the same time the unprotected vertical openings assisted the fire upward. By means of the unprotected window openings in the light area and through fire wall openings, the flames gained entry into the other sections, finally communicating to the Grand Opera House by way of the wood and metal cornice at the roof.

With the exception of the fire-resistive portion, where the loss may be anything from fifty to eighty per cent, the whole area is practically a total loss; and, in addition, heavy damage was sustained by surrounding properties.

As regards internal protection, Sections B, D. and E were covered by fifty-one A. D. T. combination fire alarm and night watch boxes.

There was a 4-inch standpipe in Section A, with a 2½-inch outlet and 75 feet of linen hose on each floor. There were also standpipe and hose in the auditorium of the Grand Opera House. On the stage, in addition to standpipe and hose, was a very old, manually-operated sprinkler system. Casks, pails and 2½-gallon extinguishers were distributed throughout.

The cause of the fire has not been determined, but the circumstances of its origin provide another striking object lesson in the results of bad housekeeping and of carelessness with regard to such matters as the proper protection of vertical and horizontal openings.

The wisdom of taking notice of the reports made, after inspection, by the National Board of Fire Underwriters is emphasized separately, but a word on the folly of allowing city ordinances to become a dead letter is needed here. Since 1902 an ordinance has been "in effect" in Pittsburgh requiring the installation of automatic sprinkler systems in basements of mercantile buildings in the "down-town" section. There is some ground for the belief that if this ordinance had been complied with in the McCrory basement the fire might have been controlled in its incipiency, and Pittsburgh's other glaring deficiencies in the matter of fire protection might, for a while at any rate, have escaped the publicity which the disaster of January 27, 1917, has brought them.

## *The Amazing Story of Pittsburgh's Neglect**

THE disastrous fire in Pittsburgh January 27 has two aspects—it was an event and a symbol. As an event of important and spectacular nature, it took its place among the news items of the day. It aroused a fleeting interest among the residents of Pittsburgh, and was noted casually by most of the papers of the country. One more fire in a nation which indulges in more than 1,500 fires a day does not command a large degree of attention.

It chanced, however, that the Pittsburgh fire was a symbol as well as an event. It was a symbol in such a peculiar and remarkable degree that numbers of papers throughout the United States have been moved to comment on the fact. In this symbolistic feature lies its chief significance.

To go back a little, a field party of engineers, employed by the committee on fire prevention of the National Board of Fire Underwriters, arrived in Pittsburgh in January, 1915, for the purpose of making a thorough inspection of the various elements relating to fire hazard presented by the city. These engineers were instructed to take nothing for granted, but to get all their information at first hand. They were highly trained and experienced specialists, and they devoted the months of January, February, March and April to the task, going into each element with the utmost thoroughness. It was their duty to see whether Pittsburgh's water supply was adequate to the requirements

Ice was a serious obstacle to the fire fighters of a special emergency; to learn whether the fire hydrants were well placed, of the right types and in good condition; to determine the efficiency of the fire alarm system; to make a study of the building conditions and of special hazards, notably those in the congested value district. In particular, it was their duty to give careful consideration to the equipment, personnel and management of the fire department in order to see whether its fire houses were well distributed, its apparatus of good design and sufficient in quantity, its men in efficient numbers, training and spirit, and its officering and management free from the deadly influence of politics. The engineers went into all of these subjects from an utterly unprejudiced standpoint for the purpose of determining existent facts, in order that their report should be a comprehensive and scientifically accurate diagnosis of Pittsburg's fire hazard.

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* By Wilbur E. Mallalieu, General Manager National Board of Fire Underwriters.

### Real Public Service

Ruins of J. G. McCrory store from Diamond Street

It would be supposed that a city of such vast commercial and industrial interests would have rejoiced at a searching diagnosis of this character, since conflagrations are almost the greatest calamity that can occur in any community. A warning should be the first step toward correction. From this standpoint the inspection of Pittsburgh, entirely at the expense of the National Board of Fire Underwriters, was a public service to the citizens. The service, however, went much further than the mere ascertainment of conditions, for the engineers accompanied their diagnosis with a complete set of recommendations, whereby all defects might be corrected in the quickest, most efficient and most economical way. It may be said that if these recommendations had been carried out in all particulars, fire protection in Pittsburgh would have approached an ideal condition. Can anyone, with the lessons of San Francisco, Baltimore, Salem, Chelsea and other cities in mind, question how greatly such results would have been for the interests of the citizens?

As already stated, the report paid especial attention to the congested value district lying in the wedge between the Allegheny and Monongahela rivers. Here in a number of blocks are great business structures teeming with occupants and stored with many millions of dollars in value. Close to the geographical center of this district the engineers found in the block bounded by Smithfield, Diamond and Wood streets and Fifth Avenue conditions of extraordinary hazard. These conditions were described in their report as follows:

### Danger is Shown

"In the eastern part, a group of three- to four-story dry goods and department stores, with partly protected wall openings, communicate through partly protected wall openings to form an excessive area. In the central part is an excessive area four-story joisted brick theater, without automatic sprinkler equipment. Other occupancies are mainly motion picture shows and 5 and 10 cent stores. Two joisted buildings are six stories high and four are of large area. The block is compactly built, having no vacant space. Buildings are of various heights and there are many inaccessible, exposed and unprotected windows in the interior of the block, by which a fire once well started in some of the large buildings of hazardous occupancy could readily sweep through the block and threaten adjoining blocks in the south and west."

In order to emphasize their view of the seriousness of the peril, the engineers prepared a map of the congested value district and indicated this one block in solid black. Thus it could not be overlooked. It stood as a menace to the welfare of the city. Its central position gave it a peculiar possibility for spreading conflagration in case of a gale blowing from any direction. Repetition of the San Francisco or Baltimore disasters was easily possible if the conditions found in this block were allowed to remain.

Herein lies the symbol of January 27. Pittsburgh, abundantly warned, specifically instructed, pigeon-holed the report with characteristic American carelessness and optimism, and promptly forgot all about it. A few weeks would have sufficed to have made the required corrections at this point. Instead of this, more than 18 months elapsed after the publication of the National Board report upon July 13, 1915, and then the inevitable happened, exactly as foretold, and a strictly preventable fire caused an inexcusable loss of several million dollars. Through great good fortune this was not accompanied by loss of life, but it requires no argument to show how easily this might have been a feature.

### Equipment Undermanned

The fire is now past history. The city probably is tired of discussing it and would like to forget it comfortably. But while its news value may have ceased, its symbolic value is insistent. For, after all, the improvement of this block constituted only one of the recommendations which the National Board engineers urged upon the city, and the purpose of this article is to call attention to a much greater and more dangerous menace that remains still uncorrected, namely, that of an undermanned fire department permeated with politics. Between 1:57 and 4:34 A. M. eight different alarms were turned in. It is reported that these alarms brought out a total of 23 companies and 141 men. The National Board report fixes 174 men as the minimum strength of these companies, and the lack of the 33 firemen unquestionably must have been a large factor in the sweep of the fire. Only one of the companies engaged—Ladder Company 5—turned out the full minimum that should have been available; all of the other companies represented a deficiency of from one to three men apiece. Since each company has a unit value in such a fight, it can be realized that practically all of the force engaged was in a seriously crippled conditions. Pittsburgh paid heavily in the early morning hours of January 27 for permitting such dangerous and inexcusable conditions to exist, and yet the lesson will have been a cheap one if the citizens determine to render its repetition impossible.

### Fortunate in Time

Suppose, for example, that this fire had not broken out in the dead of the night, when the downtown district was deserted. Suppose that it had come at a time when the buildings were filled with people, and had come in a way which gave it a headway that could not be controlled. An appalling loss of life easily might have resulted. Suppose that it had not been a calm night, but that a gale of wind had been blowing. Suppose, too, that instead of being free to concentrate upon this one fire, one or more other fires in the city had divided the attention of the department at the same time. It is a perfect possibility that Pittsburg might have ranked with San Francisco, Baltimore and Chicago in the list of historic conflagrations. Its escape in this case was due to what may well be called undeserved good fortune.

For example, on January 9, 1909, New York had to deal with not two, but five, simultaneous fires, of which one was very great and two others of much more than the usual extent and activity. These fires called out 40 engines, 12 battalion chiefs and over 600 men, as compared with the 141 who are said to have responded in Pittsburgh. On August 9, 1910, Boston had two simultaneous fires that called out practically the entire fire department and much apparatus from surrounding cities. If either of these fires had been a little larger, or if a third fire had started in any congested section, a bad conflagration undoubtedly would have occurred.

### Real Test May Come

Let it be understood, then, that while the fire of January 27 was an emergency, it was by no means such an emergency as the Pittsburgh fire department might have been called upon to meet, or may yet be called upon to meet. It is not a sufficient explanation of a large loss to say that it occurred under unusual conditions. Unusual conditions are exactly those for which fire departments are provided. A department is essentially an emergency organization. It is not constituted as a berth for "deserving politicians." It is not even primarily concerned with the welfare of its men, although every city should treat with consideration the courageous and skilful public servants who form the bodies of most fire departments. The principal purpose of such an organization is to provide its community with protection against that awful calamity, a general conflagration, and its secondary function is that of extinguishing the ordinary run of fires and of promoting measures to lessen their occurrence.

In fulfilling this secondary function, the department, of course, is giving the most practical kind of service in protecting the city from a general conflagration, since it is preventing any such conflagration from becoming a reality. However, there is a very clear distinction that must never be overlooked. Protection from conflagration hazard is so much the main objective of the fire department that it is never a sufficient achievement for such a department to be able to deal with ordinary blazes under usual conditions. The supreme test is the test of great emergency—such an emergency as may never come, but one which is an ever-present possibility.

### Danger Signs Plain

Pittsburgh has not yet faced its great emergency. It was not found in the fire of January 27. If it were found, the present department, however fine may be its individual material, would be woefully inadequate to deal with the requirements. The city, in all probability, would suffer terribly, and would suffer quite unnecessarily.

To revert again to the recent fire: It occurred in a block where the signs of danger were plainly to be read by any competent observer. They were so read by the National Board engineers, who made a specific record of their findings and turned this record over to the authorities, the press and the civic organizations of the city. The warning was not heeded, and in due time the fire occurred in natural consequence. It reported that when the fire occurred 23 companies of firemen responded promptly to the several alarms, and 141 men worked with courage and energy to extinguish the flames. It was not the fault of these 141 men that they were 33 short of the 174 men urged by the National Board as the minimum strength of these companies, but it needs no argument to show that it was a disastrous mischance for companies to be compelled to go into a great fight nearly 25 per cent too few for effective work. According to reports, one engine, that of Company No. 24, had a crew of only five men: Nos. 4, 7, 10, 11, 12, 15, 19, 32, 42 and 46 had only six men each, and none of the others was manned by more than seven men.

### Companies Lack Men

A steam fire company engine operating in a downtown mercantile district has no business responding to fire with six or even with seven men. The engineer and stoker must confine their attention to operating the engine, and there should be enough additional men to handle the two lines of hose which engines of the size in service in the downtown district of Pittsburgh should easily supply. Two men per line is certainly not enough for this work, especially at night, when the men are handicapped by darkness, and considering also the possibility of night fires gaining headway before discovery. Thus, if the statistics as to the number engaged were accurate, it will be seen that Pittsburgh met its big fire with a number of engine companies, of which every one was seriously crippled at a time of emergency, through sheer lack of sufficient men for effective work, notwithstanding the individual skill, bravery and spirit of those who responded.

Through the fortunate coincidence of a calm night and a lack of fires in other parts of the city, the loss was practically confined to one block, although, even there, it is hard to believe that it might not have been less by some hundreds of thousands of dollars, had the companies been of full strength when called into action.

Should Pittsburgh continue this menacing condition until the time of its real test, the resultant catastrophe will not be an "act of God," but an inevitable result of purely human negligence.

### Based on Authority

In order to demonstrate that these statements are not dogmatic, but are based upon incontestable authority, I wish to quote from a few of the many expressions received by us from prominent fire chiefs in different cities. Chief Kenlon of the New York fire department says:

"My experience leads me to assume that it requires nine men at night to be the equivalent of seven men during the day. The two-platoon system reducing the strength of the companies at night is one of many arguments I have advanced against it."

Fire Chief Murphy of Philadelphia says: "At night the strength should be just as great as possible, owing to the fact that the danger is greater."

Thomas R. Murphy, Fire Chief of San Francisco, a city which has had an abundant opportunity to learn the lesson of conflagration, has this to say: "In my opinion there should never be less than eight men in an engine company, nine men i a truck company and four men in a separate chemical company. The above number of men is absolutely the minimum that should be assigned to any of the above companies at any time either day or night. * * * There is no question that there is a greater difficulty in fighting fires at night against those coming in the daytime. * * * Hence it is already apparent that the night shift should be stronger than the day shift, thereby avoiding as much as possible the sending in for second, third or greater alarms, which in all instances means the leaving of certain parts of the city unprotected. That is one thing that a chief of a fire department should give very serious consideration to at all times."

### Night Force Larger

Louis O. Pujol, Fire Chief of New Orleans, writes: "In my opinion the night force of companies should be larger than the day force in order to offset the handicaps which are met by companies responding to and working at fires in the night time. * * * If a minimum daytime strength of seven men is desirable for en engine or ladder company responding to alarms * * * the night crew of same company should be increased by at least two more men, especially in the double-platoon service."

Chief Bywater of Salt Lake City says: "It is very evident that it requires more men to effectually operate the apparatus in the darkness of the night where there are all kinds of handicaps to operate against effective, quick work, so that in my judgment it is necessary to have at least two-thirds more men as quickly as possible at the fire through the night than it is through the daytime."

To these might be added many other expressions of similar import.

Pittsburgh's department responded at a time when it should have been strongest with a force that was far short of even its daytime needs. Here again the warning of the National Board report of July 13, 1915, was specific and unmistakable.

### Warning Made Plain

On page 60 of this report appears a paragraph, in boldface type, preceded by a star as an indication of special importance, containing these words: "That additional members be appointed so that the least number of men on duty at any time, including meal hours, shall be as follows:

"Seven in engine and manually-raising ladder companies in high-value district.

"Note—Under the two-platoon system each platoon should have one or more men than the above minimum required under the continuous duty system."

Had this recommendation been complied with, it would, as already stated, have given 174 men in the companies which are said to have responded on January 27. However, recent study of requirements and the expressed opinion of the leading fire chiefs of the country have convinced us that even this figure is below the reasonable requirements for night service, and we are now recommending two additional men at night over and above the daytime strength. This latter allowance would have given these companies a total strength of 196 men upon the night in question.

So much for the important question of the number of men on duty. There remains one of possibly even greater importance—that of the influence of politics upon a department which should be notably free from such distraction. Upon this the National Board makes a comment (page 35) as follows:

### Politics Are Baneful

"Supervision is, by the Director of Public Safety, dismissable at the will of the Mayor, and the effects of the harmful political influence which permeates the entire department are very apparent. The present chief of the department is a purely political appointee, without previous fire department experience, and there is no deputy chief with full power to act as chief during the latter's absence. * * * The trial records show that in many cases members who have been dismissed for good cause, after many convictions for serious offenses, have been reinstated: in consequence of this, discipline is seriously impaired and the authority of the officers is slight. The existence of a labor union among the firemen does not make for efficiency and may lead to disastrous results."

It needs no argument in any modern American city to support the contention that politics has no legitimate place in such an organization as a fire department. It repeatedly has been demonstrated in many cities that such influence is highly detrimental to its efficiency.

Let it be understood that the purpose of this article is as far as possible removed from that of merely desiring to find fault. We are anxious that our whole relation to such conditions as those in Pittsburgh should be thoroughly constructive, and feel that no greater service can be done to the citizens of a great and wealthy city than that of warning them in advance of serious peril and of pointing the way to a place of safety. It is in this spirit and this alone that we have discussed the situation.

## *Architects Active in Stockton*

THE architects of Stockton, Cal., have newly formed an association for the advancement of their interests. They plan at the same time to be of help to their home community, and to that end are agitating for the preparation of an up-to-date set of building ordinances, promising to help in such work if it be authorized by the Common Council of the city.

## *Reducing the Fire hazard of Motion Picture Films*

FOR over a year and a half the Eastman Kodak Company of Rochester, under direction of J. F. Ancona, its special engineer, conducted an experimental study of the fire hazards of motion-picture film, the results of which have now been made public through the medium of an unusually interesting volume. A summary of the experiment demonstrated clearly "that, in order to protect film and minimize the fire hazard, certain things should be done; which, in the order of their importance, are as follows:

"Protect every storage, cabinet or locker used for storing film by automatic sprinklers; radically change the present sprinkler practice by increasing the number of heads commonly used and installing ceiling baffles.

"Install ample and adequate ventilators or gas relief openings.

"Subdivide the racks by means of vertical asbestos board partitions.

"Radically change the rack construction commonly used to conform to special types.

"Keep all film in containers or cans; using round cans about 10½ inches in diameter and 1¾ inches thick.

"Store all cans on edge: that is, with the diameter in a vertical position. This makes the sprinklers more effective.

"Corrugate the tops and bottoms of all containers or cans.

"Store valuable negatives in double-wall containers or cans, lined with or made from non-heat conducting material, such as fibre board, pulp board, etc."

A more extended review of this highly important work will appear in a later issue of CONSTRVCTION.

## *Concerning Asphalt Shingles*

UNDER direction of the Prepared Roofing and Shingle Manufacturers' Association, of Chicago, a well-written and illustrated booklet entitled "Facts About Prepared Roofing and Asphalt Shingles" has been issued.

The economic aspect of the subject is taken up and the basic reason for the rapid growth in the popularity of the asphalt shingle over the wooden roof covering clearly and convincingly set forth.

Other features dwelt upon are the method of manufacturing asphalt shingles, the "functions of a roof covering; fire protection; roofing ordinances," and a series of questions and answers thereto concerning the product. Altogether the booklet is deserving of very attentive perusal from all who are or who should be interested in the important question of proper roof covering.

## Frame Structures Supply Fuel for Homes

A SECTION of Keansburg, N. J., was seriously threatened by fire on the 10th inst., when twenty houses—"mostly two-story frame structures"—were completely burned; the total loss being estimated by the local authorities at nearly $100,000.

The destroyed buildings were practically new, a number having just been made ready for occupancy. In view of the inflammable nature of the material chiefly used in their construction, the statement made by onlookers that "the flames spread with amazing rapidity," is easily understandable. Had brick, cement, terra cotta or other fire-resistant material formed the exterior walls of the burned properties instead of wood, it is a safe assumption that the fire would have been confined to the point of its origin.

## Roof Openings

(*Continued from page 234*)

### Open Air or Light Shafts

All lights at bottoms of open shafts or wells, if not of thick glass prisms set in substantial metal or concrete frames, shall be in accordance with sections 1, 2, 3, 13, 14, 15 and 16, class A, and furthermore conform to the rules governing other types of skylights as noted under class A if such types of lights are used.

### Protection of Shafts

The tops of all open shafts shall be covered by galvanized steel wire cloth screens of not less than No. 12 U. S. gauge wire not less than ¾-inch nor over 1-inch mesh, constructed and secured in accordance with section 15, class A.

### Cornices and Gutters

All cornices, inclusive of those of show windows and gutters, on the exterior of any building except from buildings, shall be of incombustible materials.

### Sheet Metal Cornices

When constructed of sheet metal, cornices shall be riveted in the seams at intervals of not more than 5 inches. Such cornices shall be secured to the walls with metal framing or anchors, spaced not more than 4 feet apart, and extending not less than 4 inches into the wall at top and bottom, independent of any woodwork; or be riveted or bolted to the structural steel of the building.

### Height

No cornice shall extend more than 5 feet above the highest roof beams of any building, and where the cornice projects above the roof the walls shall be carried up to the top of the cornice. These limitations do not refer to the pediments.

### Separation

Where the cornices of adjacent buildings are of the boxed or hollow type, they shall be separated at the party or dividing wall by solid masonry not less than 8 inches thick; in case of wooden cornices on rows of frame buildings separated by brick walls, the dividing wall shall be corbeled out at least 4 inches beyond the face of the cornice and extend not less than 8 inches above the same.

### Stops—Cornices

All combustible boxed or hollow cornices shall be stopped off at least every 30 feet by means of incombustible material, other than sheet metal, inserted in such a manner as to make tight joints in order to prevent the passage of smoke or flames.

### Stops—Rafters

Where rafters extend into cornices or eaves, the space between the rafters from the plate to the roofing shall be completely stopped by incombustible material, other than sheet metal, to prevent the passage of smoke or flames between the rafters.

## Automatic Sprinklers, Etc.

(*Continued from page 236*)

of the extent to which sprinkler protection for these classes of property has been developed in the last decade—the very important and even impressive beginning from which is to grow the complete safeguarding of these vital factors in the national life, especially now that the country is to build ships and send them, with men and supplies, to sea as never before, in support of its allies in the world war.

### Sprinklers Upon Important Vessels

In this connection it is interesting to note that the Hamburg-American steamship Vaterland, recently taken over by the Federal Government, is completely sprinklered, and that a number of other ships, chiefly passenger steamers on Long Island Sound and the Great Lakes, are similarly protected.

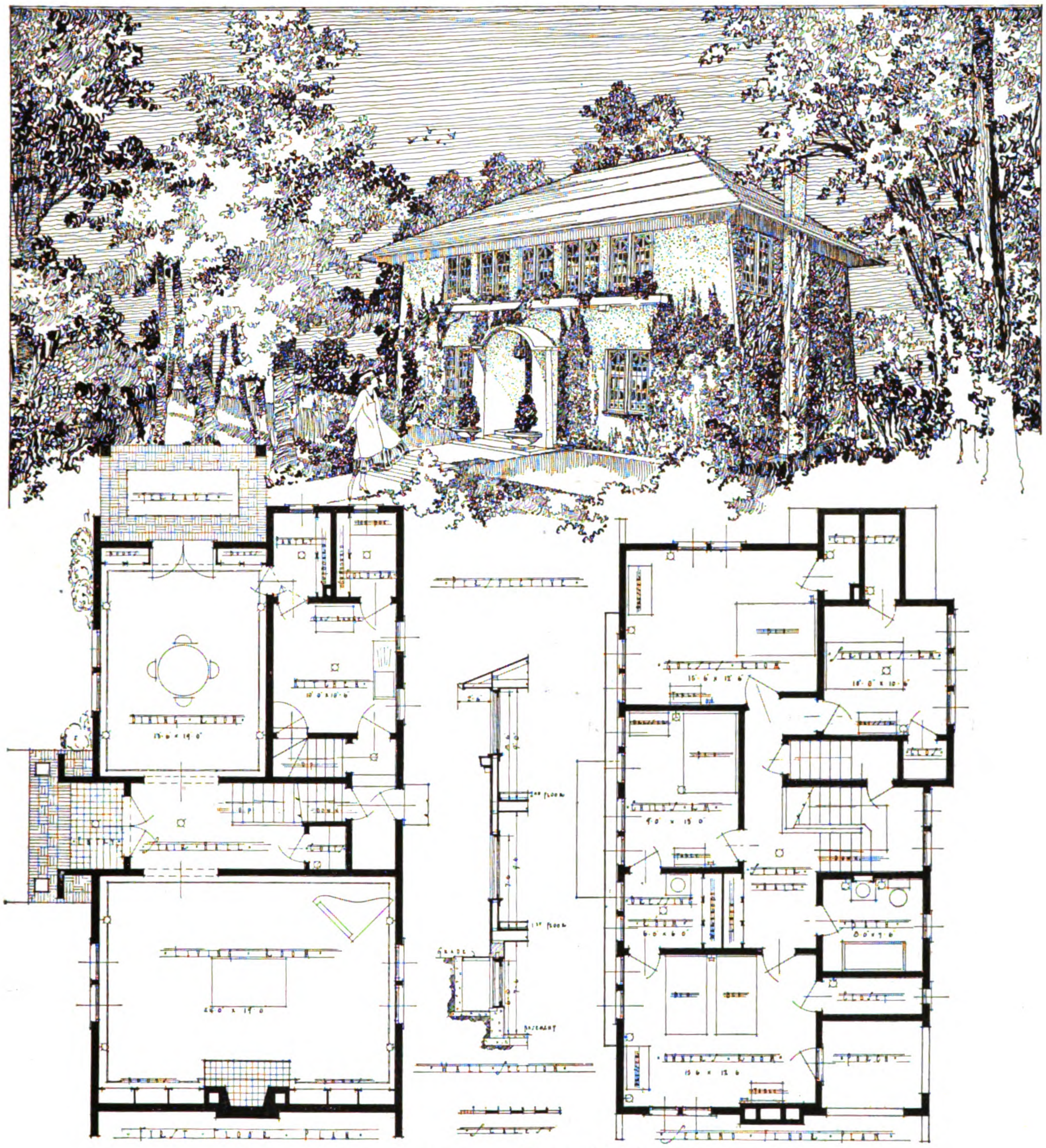
## Lack of Window Protection at Norfolk

SERIOUS fires are probable in sections of the mercantile district of Norfolk, Va., in the opinion of engineers of the National Board of Fire Underwriters, "on account of the mainly weak construction and the general lack of window protection, a fire beyond control during a high wind would probably sweep one or more blocks and would endanger a large part of the district."

Appreciating the need for modernized building regulations in their city members of the recently-formed Building Contractors and Allied Trades Exchange, of Eau Claire, Wis., are planning to assist in bringing about such result.

# SAFE HOMES

**Edited by RALPH P. STODDARD, Secretary**
**Society Advocating Fire Elimination**



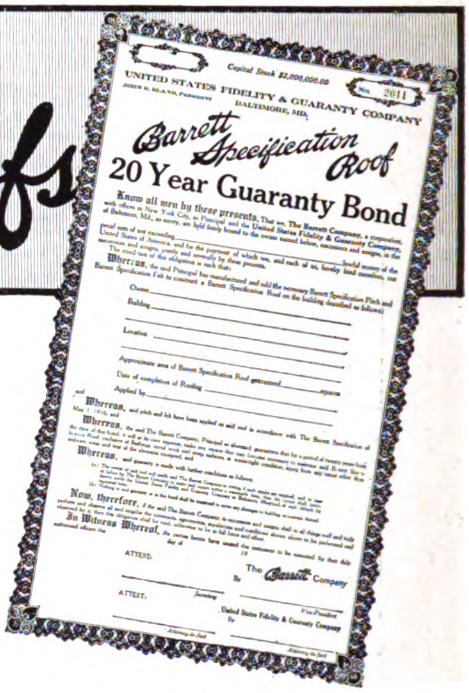
**An Interesting Masonry Exterior**

*Lawrence Robert Langbein, 805 Board of Trade, Indianapolis, Ind.*
*Built at Kenilworth, Ill., at a cost of $5,398*

UNDOUBTEDLY a unique design, but with peculiarly attractive and assuring comfort, is that of Lawrence Robert Langbein, of Indianapolis, Ind. This house was built at Kenilworth, Ill., at a cost of $5,398.

The exterior walls are constructed of concrete, a feeling of solidity being given by the constructing walls on a slight inward angle instead of the usual perpendicular. Window treatment in this design is good, and it will be seen at a glance that much can be added by proper landscape gardening. Entrances lead from tiles or brick floored terraces. The living and dining rooms are spacious and well-lighted. On the second floor plan will be united the special features of dressing room off the owner's room, sleeping porch and large bathroom.

# Barrett Specification Roofs



Capital Stock $2,000,000.00

UNITED STATES FIDELITY & GUARANTY COMPANY

BALTIMORE, MD.

No. 2011

Barrett Specification Roof

20 Year Guaranty Bond

Owner

Building

Location

Approximate area of Barrett Specification Roof guaranteed ... squares

Date of completion of Roofing

Applied by

ATTEST:

The Barrett Company

By

Vice-President

ATTEST:

United States Fidelity & Guaranty Company

By

Attorney-in-fact

## An Ideal Factory—
## *and an Ideal Roof*

THE modern manufacturer floods his workrooms with sunshine, and his workmen keep in better health and do better work. Here is one of these factories. It is built in the most modern and scientific manner and is covered with a Barrett Specification Roof.

This is not to be wondered at. The wonder would be if some other type of roof had been specified, because most of the permanent structures of the country are covered with Barrett Specification Roofs.

This preference is due to the fact that such roofs cost less per year of service than any other kind; that they are free from all maintenance expenses and, further, because they are guaranteed for twenty years.

In addition, Barrett Specification Roofs take the base rate of fire insurance and are approved as "Class A" construction.

This combination of 20-Year Guaranty with low cost and low insurance rate has put these roofs in a class by themselves.

### *Guaranteed for 20 Years*

We are now prepared to give a 20-Year Surety Bond Guaranty on every Barrett Specification Roof of fifty squares and over in all towns in the United States and Canada of 25,000 population and more, *and in smaller places where our Inspection Service is available.*

This Surety Bond will be issued by the United States Fidelity and Guaranty Company of Baltimore and will be furnished by us *without charge.* Our only requirements are that the roofing contractor shall be approved by us and that The Barrett Specification, dated May 1, 1916, shall be strictly followed.

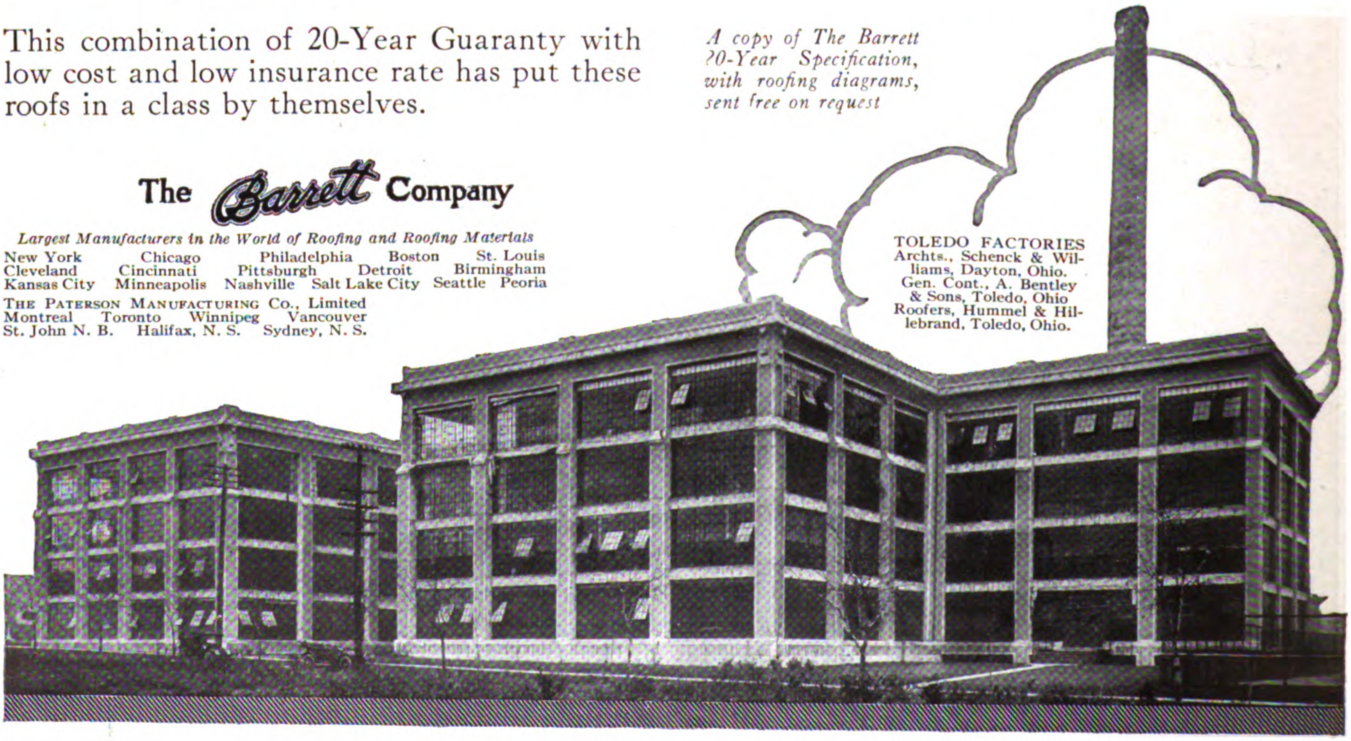
*A copy of The Barrett 20-Year Specification, with roofing diagrams, sent free on request*

**The Barrett Company**

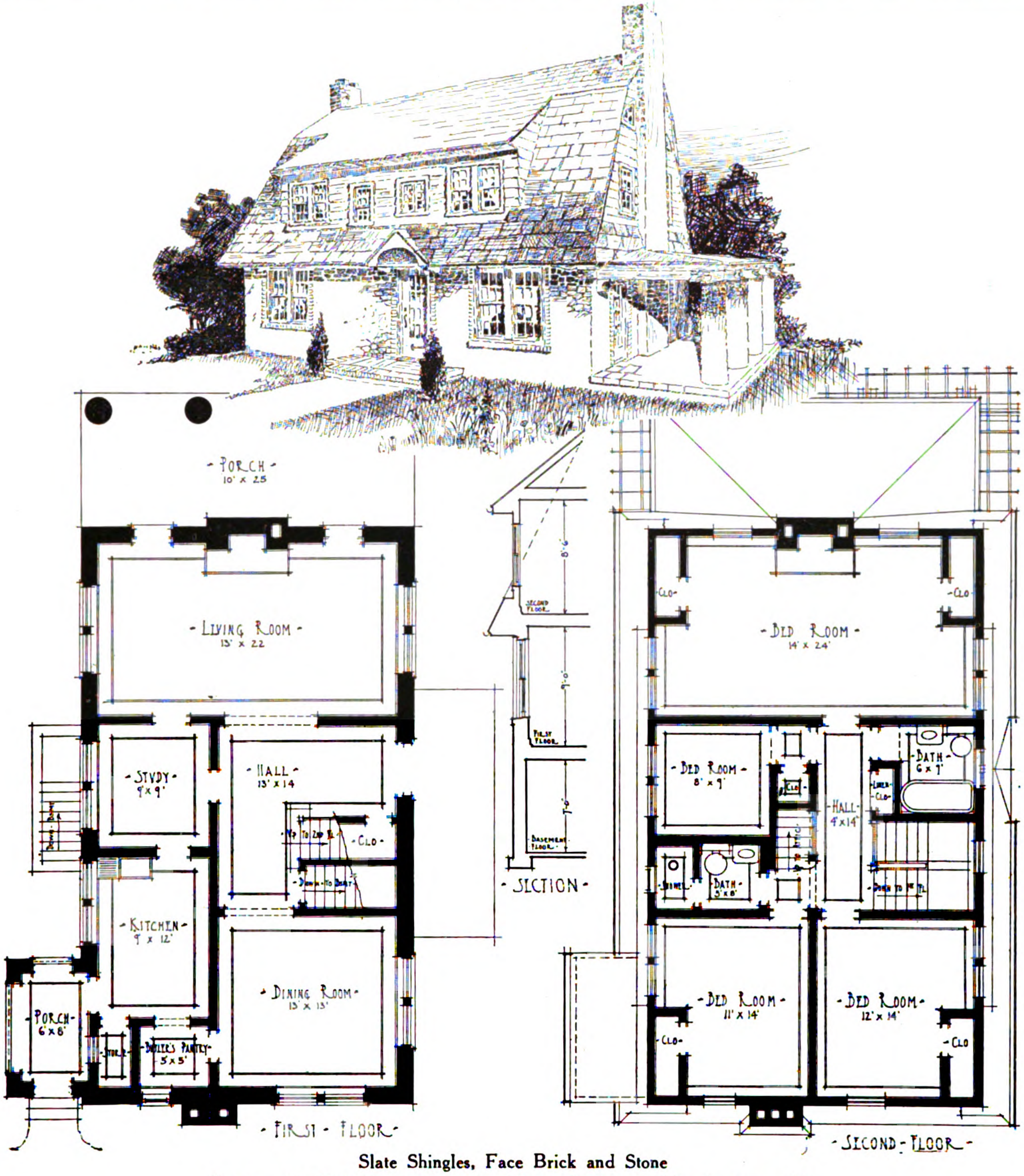
*Largest Manufacturers in the World of Roofing and Roofing Materials*

New York Chicago Philadelphia Boston St. Louis
Cleveland Cincinnati Pittsburgh Detroit Birmingham
Kansas City Minneapolis Nashville Salt Lake City Seattle Peoria

THE PATERSON MANUFACTURING CO., Limited
Montreal Toronto Winnipeg Vancouver
St. John N. B. Halifax, N. S. Sydney, N. S.



TOLEDO FACTORIES
Archts., Schenck & Williams, Dayton, Ohio.
Gen. Cont., A. Bentley & Sons, Toledo, Ohio
Roofers, Hummel & Hillebrand, Toledo, Ohio.



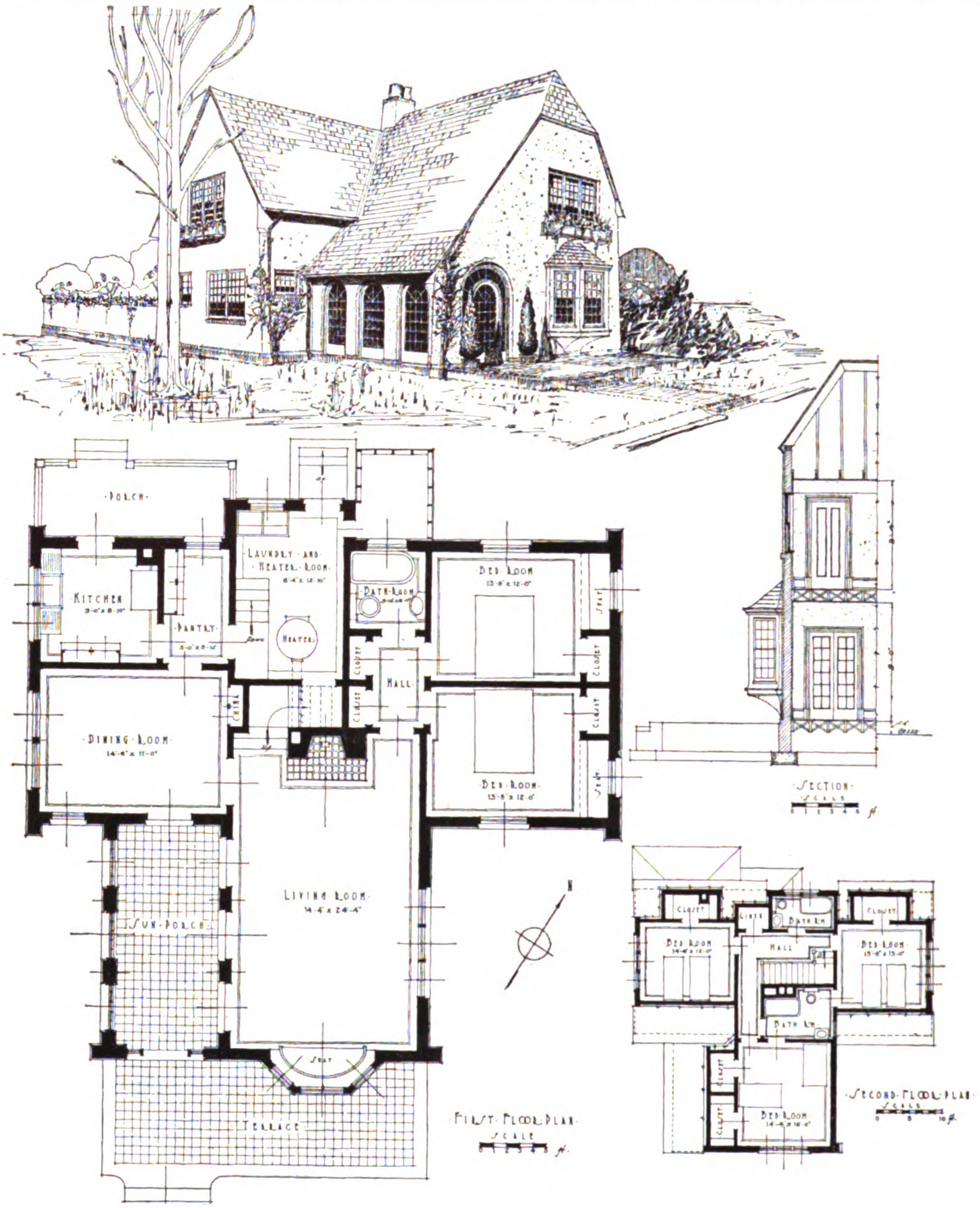
**Slate Shingles, Face Brick and Stone**

*Eugene H. Knight,* 1134 *Brown-Marx Building, Birmingham, Ala.*

*Built at Sewannee, Tenn., at a cost of* $3,974.14

THE possibilities in this design for the use of several masonry materials are interesting. The roof, as shown, can be surfaced with large units of slate; windows and doorways are outlined with face brick, exterior wall surfaces are paneled with rough-cut stone or cement block, porch is of concrete construction, with clay tile floor—surely a safe home.

The layout of floors is excellent, rooms being large and square, with ample closet space and light. Features of special interest are the study, conveniently located off the living room; the L-shaped hall which gives entrance to each room on the first floor; the roomy bedroom above the living room and the arrangement of two bathrooms, which add greatly to the convenience of the sleeping quarters. It will be noted that one bathroom is equipped with shower located in separate room.

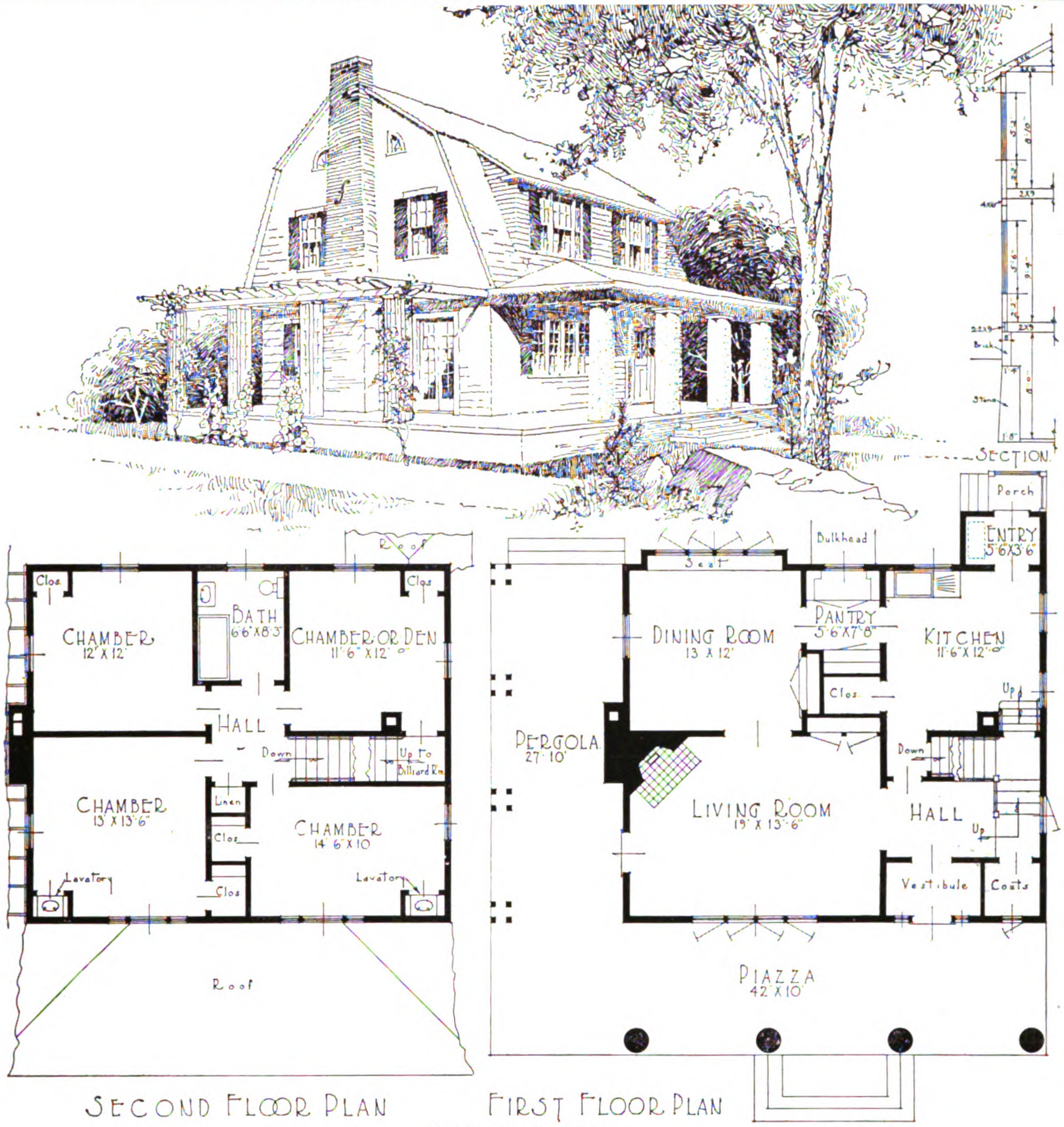


**Stucco and Firesafe Shingles**

*Frank A. Berry, Guarantee Trust Building, Atlantic City, N. J.*
*Built at Ventnor, N. J., at a cost of $5,387*

AN interesting and attractive house in which the treatment of windows and the use of odd roof planes has been employed to give character and simple beauty is that designed by Frank A. Berry, of Atlantic City, N. J., and built at Ventnor, N. J., at a cost of $5,387.

The ground floor plan is excellent and contains many valuable suggestions for the prospective home owner. The living room, because of its location in a wing of the house, is particularly well lighted: in fact, it will be noted that the walls are largely in the form of glazed doors and of windows. The window seat and fireplace are good features. The dining room is simply designed with the special feature of a built-in china closet. A valuable feature and one which will appeal to the housewife is that of a well-lighted and conveniently-located laundry on the ground floor. Bathrooms and bedrooms are provided on each floor, one bathroom being located on the first floor and two on the second—an arrangement of particular convenience for entertaining.



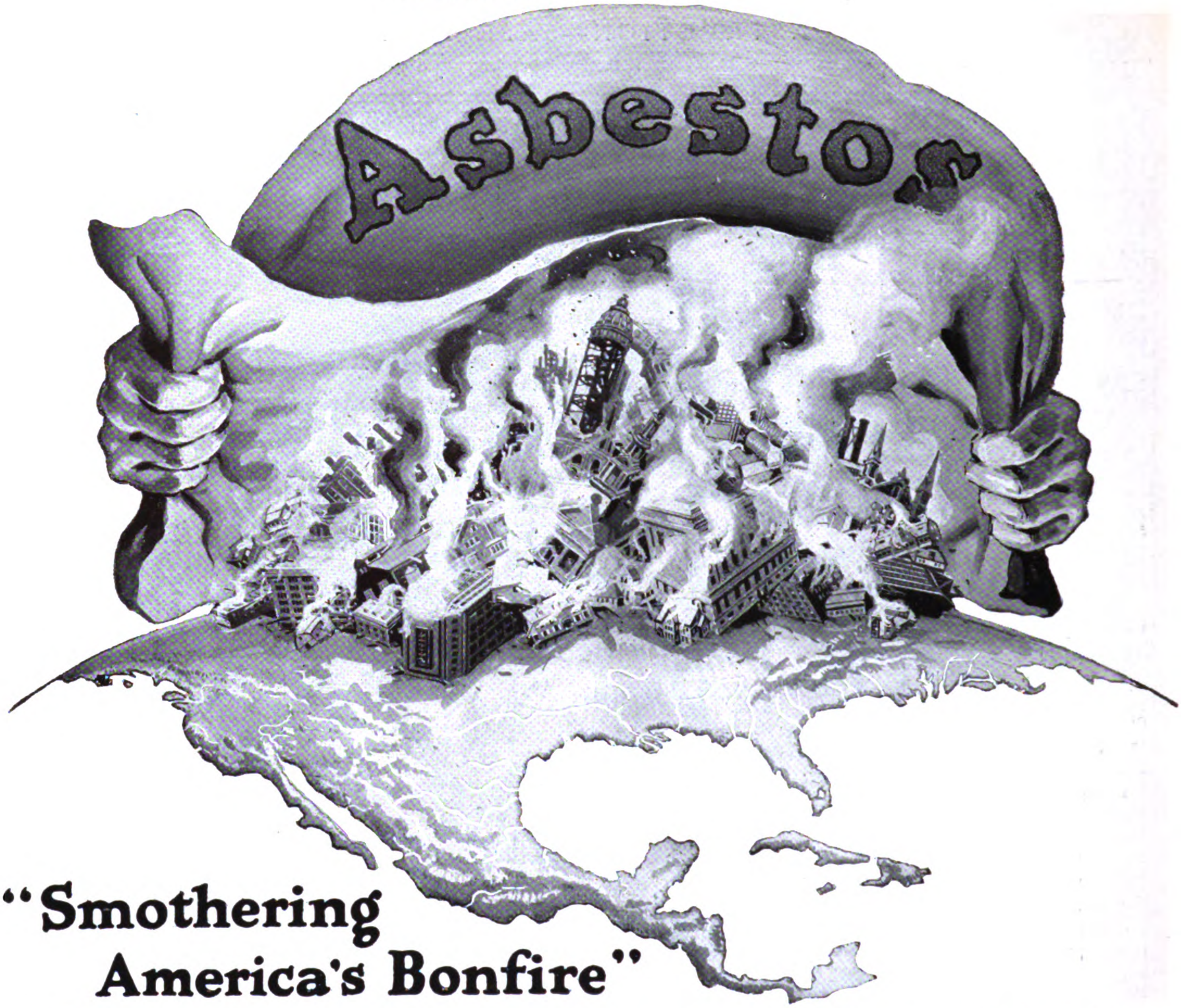
**A New England Home**

*H. E. Mason, Keene, N. H., and S. Wesley Haynes, Leominster, Mass.*
*Keene, N. H., $3,690*
*Built at Keene, N. H., at a cost of $3,690*

SEVERAL odd features are noted in this design, by H. E. Mason, of Keene, N. H., and S. Wesley Haynes, of Leominster, Mass. The design calls for the use of wood exterior, but at little increased cost this might be constructed of masonry materials. The large porch, pergola and Colonial chimney constitute attractive features. On the first floor the large, open fire place located in the corner of the living room immediately attracts attention. This is a feature which would allow of interesting interior decoration and arrangement. In the dining room the roomy window seat adds to comfort, while both rooms are well lighted and equipped with swinging windows.

On the second floor the installation of lavatories in the bedrooms is a convenient feature, while the top floor, instead of the usual attic, has been finished for a billiard room.

This is an unusually attractive home at the modest cost of $3,690, at which cost it was built in Keene, N. H.



"Smothering America's Bonfire"

THIS burnt offering to the gods of waste and ruin is one of our great national losses. In the last twelve months it has cost the nation Two Hundred and Fifty Millions in money, and who can measure the misery?

The passing news of a distant city gutted by fire is soon forgotten. But if you were one who has stood beside the blackened heap, that a little while before was home or place of business, you would realize the grim tragedy of it. The community fire is a personal thing to each of us. Its prevention is only secured by the safeguarding of individual buildings—your property. And this is mostly a matter of choosing a roof. Roofs are the targets at which fire aims as it cuts its horrible swath. A Johns-Manville Asbestos roof checks its course, turns it back and protects the property under it. Johns-Manville Asbestos Roofing is nature's own fire repellant mineral fashioned into roofing—a type for each building, whether house, factory, barn, church, school or public building. When you decide on Johns-Manville Asbestos Roofing you have solved your problem of property protection against the roof-communicated fire. You have done your share toward the elimination of a local fire hazard. You are helping to smother the national bonfire.

You will find your roofing in this list: Johns-Manville Asbestos Built-up Roofing for flat roofs; Asbestos Ready Roofing for sloping surfaces; Transite Asbestos Shingles for the home; Corrugated Asbestos Roofing for skeleton frame structures.

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
*10 Factories—Branches in 55 Large Cities*

*Johns-Manville Asbestos Roofings are examined, approved and labeled by the Underwriters' Laboratories, Inc., under the direction of the National Board of Fire Underwriters.*

JOHNS-MANVILLE SERVICE COVERS THE CONTINENT

JOHNS-MANVILLE
Service in Fire Prevention

**WEATHER:** Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

# The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

**LATEST EDITION**

Copyright by Construction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., May, 1917

**Priceless**

## GOVERNMENT'S ATTITUDE TOWARD STEEL PRODUCTS

A steel manufacturer, when asked for his opinion as to the attitude of the Government toward steel purchases and prices, replied:

"The question is: 'Can the Government eat its cake and have it?'

"Artemus Ward's famous offer of certain of his relatives as recruits during the Civil War is being duplicated to-day in the generous attempts which are being made by some of our legislators and Government officials to lay other men's property and business on the altar of patriotism.

"I refer particularly to the published statements that a large tonnage of steel required for war purposes, including merchant ships, is to be secured from the manufacturers at prices based on those ruling over a series of years, and which are very much below those that are being currently paid by the trade.

"This proposition is based, of course, on the prevalent idea that the steel manufacturers are makink enormous profits. While it is true that prices of steel products are abnormally high, it is also true that the cost of production is abnormally high. This is clearly shown by the following comparison of the principal elements entering into the cost of producing steel, i. e., labor and materials:

COMPARISON OF PRICES

| | July, 1914 | May, 1917 |
|---|---|---|
| Connellsville coke, f. o. b. oven. | $1.75 | $8.00 |
| Bessemer Iron, f. o. b. Pittsb'g. | 14.90 | 44.95 |
| Basic Iron, f. o. b. Valley Fcs. | 13.00 | 42.00 |
| Ferro-manganese .............. | †37.70 | ‡425.00 |
| *Common labor (10 hours).... | 2.00 | 3.00 |

* Other labor rates are based on common labor. † Baltimore. ‡ Pittsburg.

In their desire to serve our country, the steel manufacturers will take their stand in the front rank. They will not question the right or the propriety of the Government insisting on preference being given to war materials over any other orders on their books.

"In fixing the prices, however, they feel that there is grave danger in any policy which attempts to arbitrarily fix the prices received at a low figure, while most of the factors entering into the cost are not and, in the nature of the case, apparently cannot be limited.

"Such a course must inevitably have a disturbing influence on many lines of trade, as we must assume that the Government is not going to discriminate against the steel trade, but will attempt to fix arbitrarily prices on all commodities, including raw materials, which are directly or indirectly required for national defense.

"Aside from this disturbance to business, from the standpoint of revenue alone, it would seem to be an ill-advised policy; certainly if the manufacturers are not permitted to make profits, there can be no revenue from either the income tax or the excess profits tax.

"The safer and more profitable method would be to place the Government business at current market rates, less such a discount as would be given to any other large and responsible buyer; insist on preference being given over all other business; and then, when the manufacturer has made his profit under fair competitive conditions, take from him by taxation his fair proportion of whatever may be necessary to provide the funds for the prosecution of the war.

"Under such conditions, the burden will be distributed equitably; business will follow the law of supply and demand, and there will be no criticism, however high the tax rate may be fixed, provided it is assessed equally on all citizens."

## Product of Merchant & Evans Company

In order to give architects and engineers not acquainted with its product opportunity to inform themselves in such connection, the Merchant & Evans Company, of Philadelphia, is sending out samples of its High Grade Roofing Plate, together with proper description matter. The material used has been tested under all sorts of weather conditions for years, and has more than justified the claims of its manufacturers.

In addition to roofings, the Merchant & Evans Company also makes the well-known Evans "Almetl" fire doors and shutters, the Star Ventilators, Metal Spanish Tiles, metal shingles and the like. After critical examination of the sample products supplied architects, engineers and others favored with their receipt, will find the Roofing Tin Specifications also furnished by the Merchant & Evans Company of peculiar value.

◆

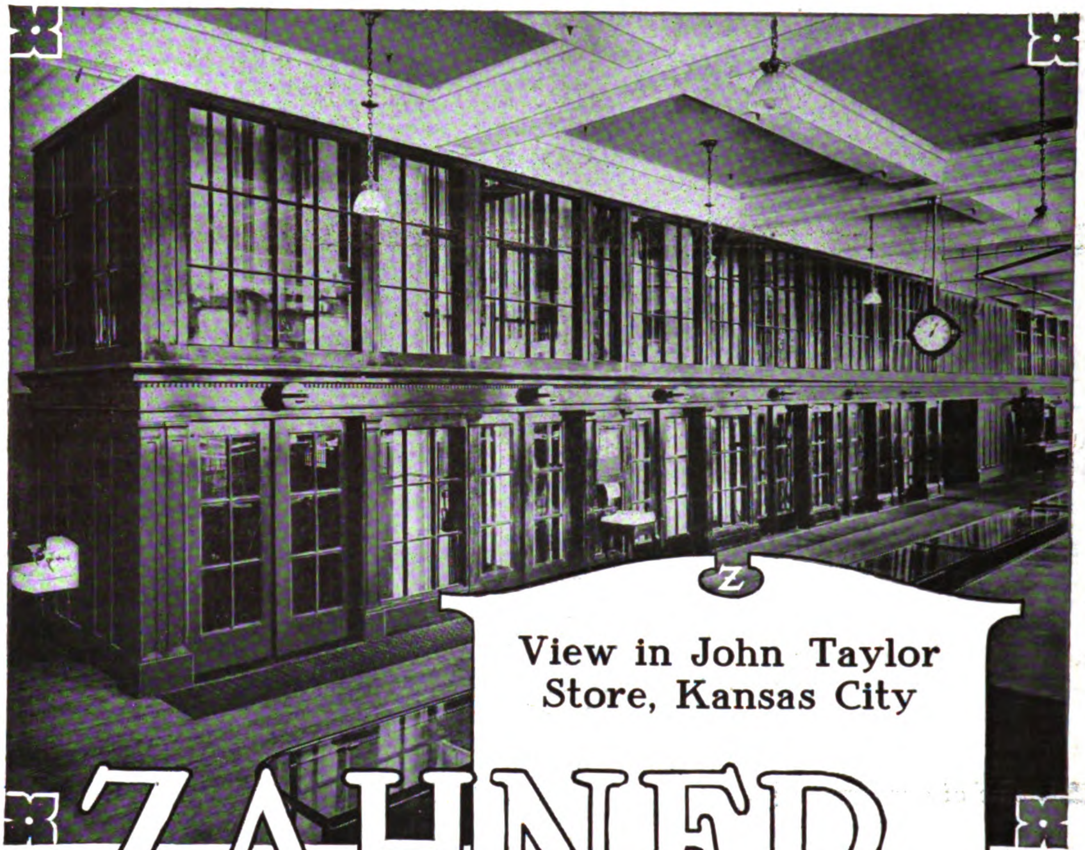
## HOMES FOR WORKINGMEN AT AKRON

Contract for the erection of 275 of the 1,000 houses that the Goodyear Rubber Company, of Akron, Ohio, plans to build for its workmen has been given to the A. S. Wilson Company, of Pittsburgh.

The houses are to be sold to employees for 25 per cent in excess of actual cost, but when an employee who has bought, or is buying a house, has been with the company for five years, the 25 per cent is returned to him when his house is entirely paid for and the property is deeded to him at actual cost, without interest.

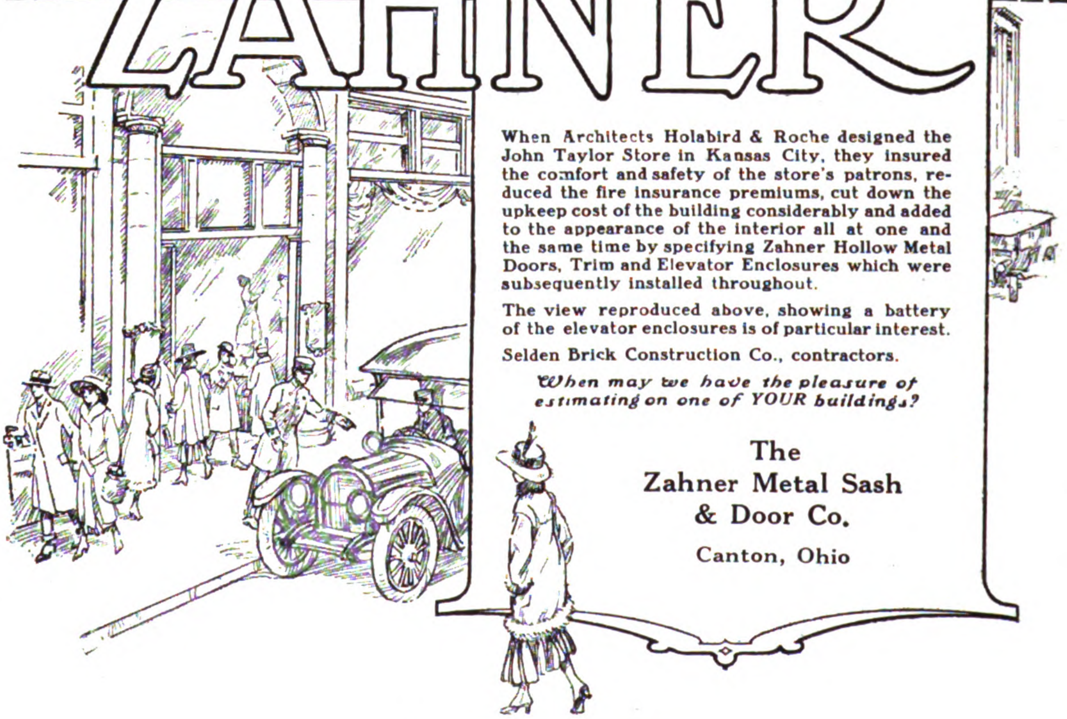
◆

The ninth annual convention of the National District Heating Association will be held at Detroit, Mich., on June 12 to 15.



View in John Taylor Store, Kansas City

ZAHNER



When Architects Holabird & Roche designed the John Taylor Store in Kansas City, they insured the comfort and safety of the store's patrons, reduced the fire insurance premiums, cut down the upkeep cost of the building considerably and added to the appearance of the interior all at one and the same time by specifying Zahner Hollow Metal Doors, Trim and Elevator Enclosures which were subsequently installed throughout.

The view reproduced above, showing a battery of the elevator enclosures is of particular interest.

Selden Brick Construction Co., contractors.

*When may we have the pleasure of estimating on one of YOUR buildings?*

The
Zahner Metal Sash
& Door Co.
Canton, Ohio

**THE ZAHNER METAL SASH AND DOOR CO.**
CANTON

*Branches in all Principal Cities*

*New York Office*
*42nd Street Building*

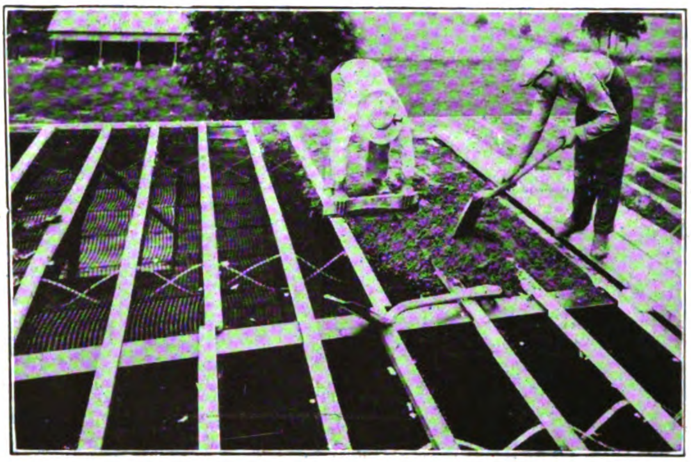
EASE AND SPEED OF INSTALLATION

THIS exceptionally strong and fireproof construction is so simple in design that previous experience in its erection is not necessary. Erection drawings are furnished with each shipment and each piece is cut to fit and marked to correspond with the identification marks on erection diagrams.

BERGER'S
Metal Lumber
(Patented)

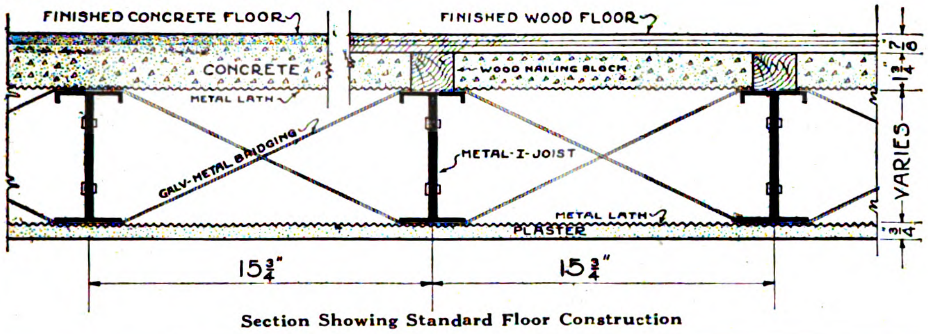
THE STANDARD FLOOR CONSTRUCTION

**Joists**—Set without forms or centering. **Bridging**—One inch flats nailed into webs of joists. **Metal Lath**—Applied to bottom by means of prongs laid on top of joists and nailed into web with roofing nails. **Wood Nailing Blocks**—Placed on top of and parallel to the joists and nailed directly into the web of the joist. **Concrete Fill**—1, 2, 4 mixture, applied on metal lath without forms. See illustrations.



Madison Township School, Trotwood, Ohio
Albert Pretzinger, Architect, Dayton, O

See Sweet's, pages 244–250 and write for Bulletin L. C.



Section Showing Standard Floor Construction

The Berger Mfg. Company
Canton Ohio

Branches: Boston New York Philadelphia Chicago St. Louis Minneapolis San Francisco Los Angeles
Export Dept.: Berger Bldg., New York City, U. S. A.

## Safe Cabinet Company's Intensive Business-Getting Campaign

As a proper preliminary to its intensive business-getting campaign which started May 10, the Safe Cabinet Company, of Marietta, Ohio, held a gathering of sales representatives at its home offices during the early days of March. Representatives, all intelligent and enthusiastic, were present from 48 States of the Union, as well as from Cuba and Mexico, in both of which countries the product of the Safe Cabinet Company is rapidly gaining in popularity.

The sole purpose of the school was to enable those who have so loyally represented the company to get together for a thorough schooling in the product and the best methods to employ in selling it and other lines in the office appliance field, and furthermore to establish a closer acquaintanceship among all, thereby insuring the most profitable co-operation in the future.

A cordial welcome was extended the visitors by R. H. Dick, general manager of the company, and by several leading municipal officials.

In the course of the gathering short, snappy and illuminating talks were made by President Dick, Secretary and Sales Director D. R. Babbit, A. L. Murray, of the foreign department, Advertising Manager J. W. O'Harrow, Jr., Special Representative Frederick P. Flanagan and a number of the field men.

So successful was the gathering that others of like character will be held from time to time, to the benefit of all parties at interest.

◆

## TEN TONS OF TONCAN USED ON ONE JOB

Ten tons of Toncan metal galvanized sheets were used for cornice and coping on the Utica Free Academy and Technical High School, Utica, N. Y., recently constructed.

## CEMENT SACKS

A few truths concerning cement sacks are given by E. V. Aldridge, manager of the Sack Bureau of the Universal Portland Cement Company, of Chicago, in a circular letter addressed to building material supply dealers throughout the country. The statements and suggestions made are not only of pronounced interest, but if carefully heeded would result in a distinct profit to all parties concerned. In these days when "conservation" should be the general slogan, all users of cement should look well to their return sacks.

◆

## TILE IN KITCHEN CONSTRUCTION

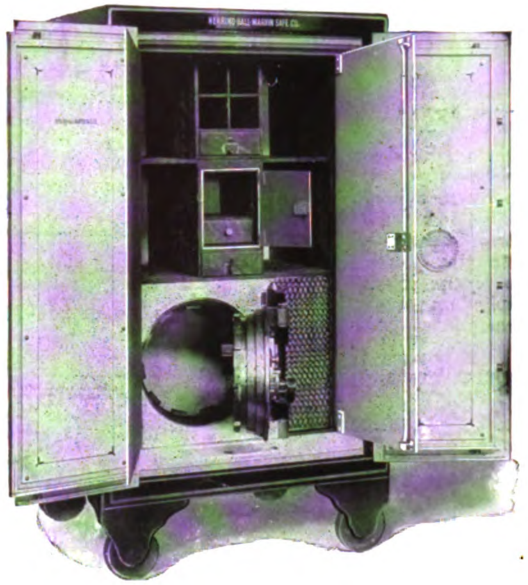
"A Real Kitchen" is the title of the latest print issued by the Associated Tile Manufacturers. The view shown is that of a kitchen in a prominent Seattle, Wash., residence and illustrates one of the many uses to which tile may be used to advantage.

◆

*Burying the hatchet should be a preliminary to using the hammer.*

# HERRING-HALL-MARVIN SAFE COMPANY

***Designers and Manufacturers of***



**Fireproof and Burglarproof**

## SAFES, VAULTS & SAFE DEPOSIT BOXES

**For Offices, Residences, Banks and Bankers**

***We offer the benefit of our experience of over seventy-five years in the manufacture of fire and theft-resisting safes and vaults and specially constructed Burglarproof equipments for Banks and Safe Deposit Companies.***

**Plans and Specifications furnished without cost**

Executive Offices
400 B'way, New York

Factories
Hamilton, Ohio

**Branches**

*Boston, Mass.* *San Francisco, Cal.* *Chicago, Ill.*
*Birmingham, Ala.* *New York, N. Y.*

## TO STUDY SOUTH AMERICAN POSSIBILITIES

Dr. Robert Grimshaw, special agent United States Department of Commerce, about June 1 is going to South America under arrangements with the Department of Commerce and in the interest of American manufacturers of metal working and wood working machinery and prime movers, to investigate the market therefor these and also the methods that the different governmental and municipal authorities have for inviting bids for supplies, for awarding contracts and for bonding successful bidders.

He will go down the West Coast and up the East and visit every South American country except the Guianas. He will find out what the manufacturers there have been getting from abroad: from what country and from what maker and at what price. He will send photographs of machines to the Department of Commerce Museum, 109 Custom House, New York. He will collect samples of twist drills and other hand tools, tag them with similar data and send them up for the museum also. He will make a card index of all the manufacturers and importers down there for use of American manufacturers and exporters, so that they may get into direct touch with consumers and follow up sales.

This investigation will take about eighteen months to complete.

Before undertaking this work, Dr. Grimshaw was a member of the faculty of New York University. Previous to that and for twenty years, up to December, 1914, he was in Germany as consulting engineer for the Bavarian Government, Department of Mines and Manufacturers, and for large private concerns.

◆

## TRADE NOTES

Hereafter the Minnesota Farmers Brick and Tile Company, of Austin, Minn., will be known as the Austin Brick and Tile Company, decision to adopt the new name having been made at the recently held annual meeting of the corporation.

R. A. Fontain, of Roanoke, Va., has perfected a mechanical device for loading and unloading brick without the aid of manual labor.

Those interested in brick-making machinery will do well to secure and attentively peruse a copy of the catalogue lately issued by Chambers Brothers Company, of Philadelphia, Pa. The corporation has been actively in business for over fifty years, during which entire time steady progress has been made in perfecting machinery that would more surely, artistically and economically perform the work for which it is designed.

The Dennison Interlocking Tile Company, of Cleveland, Ohio, will in future operate the Hillsboro, Ill., plant of the Kortkamp Brick and Tile Company, which is but another way of saying that the properties will be thoroughly modernized in every respect.

When improvements now under way shall have been completed the capacity of the Robinson Brick Works, of Charleston, W. Va., will be increased from 15,000 to 40,000 bricks a day.

With a capital of $225,000, the Hosier Clay Products Company has been formed at Montezuma, Ind.

With a capital of $50,000 the Jewell Steel and Malleable Company of California has been formed at San Francisco. It will manufacture steel and malleable castings.

To build a $75,000 plant at Dale, Ind., subscriptions are being sought by the Southern Indiana Clay Products Company. The purpose of the new investment is to manufacture building brick, roofing tile and fireproofing blocks.

Architects, builders and property-owners are being advised of the merits of the "American" metal shingle by its manufacturers, the Milwaukee Corrugating Company, of Milwaukee, Wis.

◆

## SUMMER MEETING OF CERAMIC SOCIETY

A gathering of the American Ceramic Society will be held this summer in various centers of Southern and Central New York State. Assembly will be at Hornellsville on July 2; visits being later paid to Alfred, Corning, Geneva, Canandaigua and Rochester, where clay working plants will be studied at close range. The meetings will close on July 6.

## OPENS OFFICE AT PORTLAND, ORE.

To more satisfactorily handle its increasing business upon the Pacific Coast, the Burrell Engineering & Construction Company, of Chicago, has opened offices at Portland, Ore. The corporation will center its energies upon the building of grain elevators and mills, a type of construction upon which it has specialized for some years.

◆

## RANSON BANTAN PAVER

To meet the demand for a small efficient concrete mixer, the Ransom Concrete Machine Company, of Dunellen, N. J., offers the Ransom Bantam Paver.

◆

## EXTENDS ITS LINE

The Bethlehem Steel Company announces the purchase of the property and plants of the American Iron & Steel Manufacturing Company, located at Lebanon and Reading, Pa.

◆

The Excavating & Screening Machinery Company, of Minneapolis, is advising contractors as to the particular merits of its sand-and-gravel screen. These are made in 400- and 600-yard units and are strongly endorsed by those who have tested them under practical working conditions.

◆

To advance the interests of the brick industry, the Northwest Face Brick Association was lately formed at St. Paul, Minn. John T. Harrington, of the Twin City Brick Company, is president of the organization; F. H. Merrill, of the Belt Line Brick Company, vice president, and C. A. Gunn, secretary-treasurer.

◆

A late Wilmington, Del., incorporation is the Hartford Brick & Sand Corporation. Its Capital is $300,000.

◆

To secure funds for increasing the plant of the Pennsylvania Fire Brick Company, of Lock Haven, Pa., the capital of the corporation has been increased from $250,000 to $500,000.

*She:* "If we must cut down expenses, why not drop your life insurance?"
*He:* "Not much. That's *your* insurance, not mine. I figure we can trim about all the other items so as to save at least $400 a year, and I'm going to take a hundred of that and buy another Postal policy while I can get it. You and the kiddies may be glad some day."
*She:* (thoughtfully) "I guess you're right at that, Jim."

## Put Life Insurance in Your Family Budget —and Keep It There

THE *real* husband always makes a liberal allowance for life-insurance whether his wife wants him to or not, but the sensible woman *does* want him to when she considers it seriously.

And whether times are hard or easy they both want the most protection possible for their money, and hundreds of them during the last decade have therefore been turning to the

## POSTAL LIFE INSURANCE COMPANY

The Postal employs no agents but issues its policies direct. Agents' commissions and office-expenses are thus saved and go to its policyholders.

It is not alone the Company of Safety and Service but also of Saving, for you will find net cost low—lower than ever before—because the Postal's actual underwriting experience has enabled it now to make a

**10%** reduction in premium rates with a continuance of the annual guaranteed dividend of **9½%**

***Besides these savings, the Company pays the usual contingent dividends, depending on earnings.***

If you are in good health you should take advantage of the 10% reduction in premium-rates and other Postal economies.

### Find Out How Much *You* Can Save At Your Age

on any standard form of Policy—Whole-Life, Limited-Payment Life, Endowment, Joint Life, or on a Monthly Income Contract.

The Postal issues all of the standard forms, and operates under the strict supervision of the New York State Insurance Department and is subject to the United States Postal authorities.

To get exact figures for your age, simply fill out the coupon and mail today.

Remember: No agent will be sent to visit you. The Postal Life employs no agents; resultant commission-savings go to *you* because you deal *direct.*

**POSTAL LIFE INSURANCE COMPANY**
WM. R. MALONE PRESIDENT
THIRTY-FIVE NASSAU STREET NEW YORK

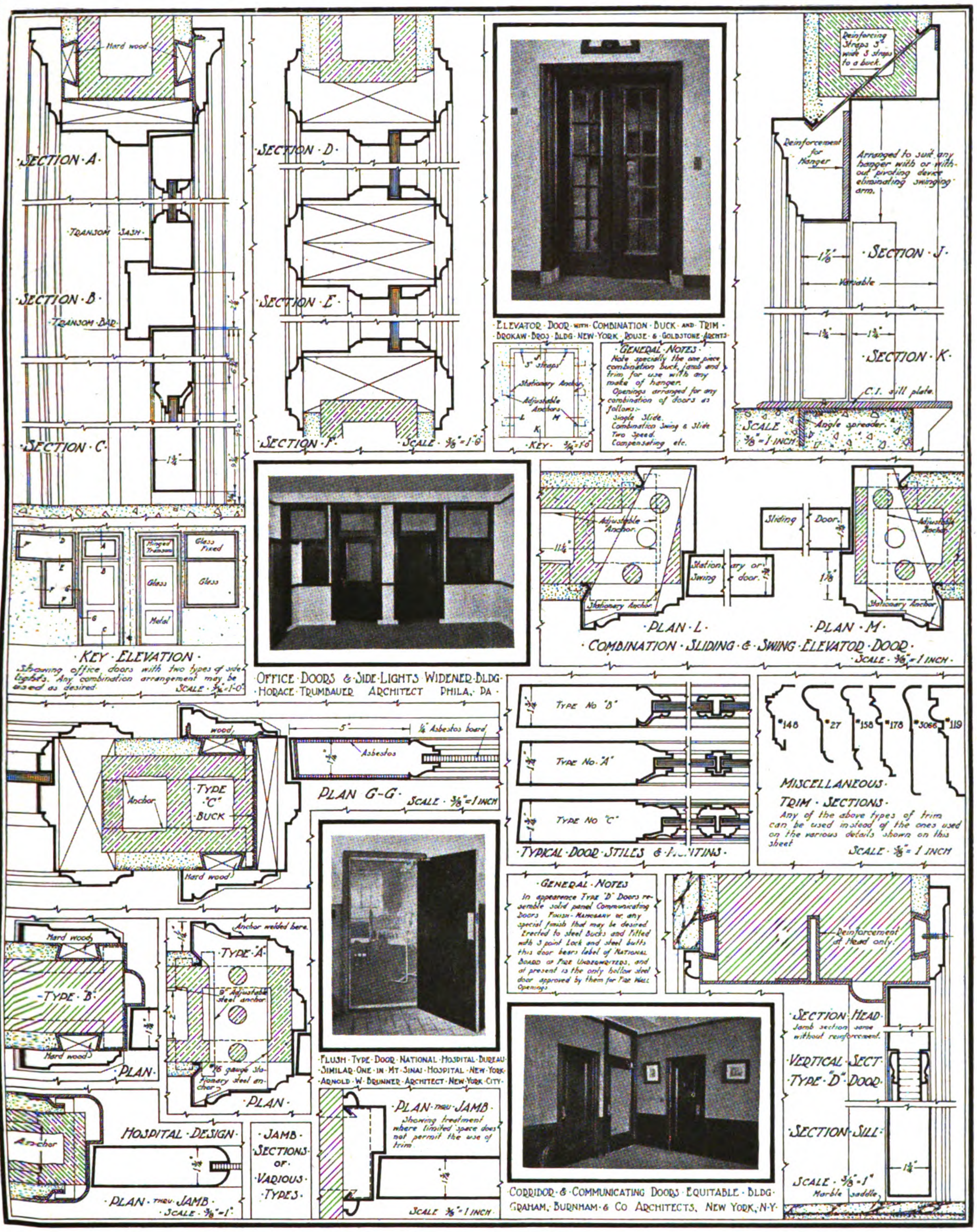
**Postal Life Insurance Company**
**35 Nassau St., N. Y.**

Without obligating me, please send full insurance particulars for my age.

*Name* ........................
*Address* ........................
........................
*Occupation* ........................
*Exact date of birth* ........................

# FIRE SAFE DOOR WAYS

## STEEL DOORS, BUCKS and TRIM



·ELEVATOR·DOOR· WITH ·COMBINATION·BUCK· AND ·TRIM·
·BROKAW·BROS·BLDG·NEW·YORK·ROUSE·&·GOLDSTONE·ARCHTS·

·GENERAL·NOTES·
Note specially the one piece combination buck, jamb and trim for use with any make of hanger.
Openings arranged for any combination of doors as follows:-
Single Slide.
Combination Swing & Slide
Two Speed.
Compensating etc.

·KEY·ELEVATION·
Showing office doors with two types of side lights. Any combination arrangement may be used as desired. SCALE·3/16"=1'-0"

·OFFICE·DOORS &·SIDE·LIGHTS·WIDENER·BLDG·
·HORACE·TRUMBAUER ARCHITECT PHILA,·PA·

MISCELLANEOUS·TRIM·SECTIONS·
Any of the above types of trim can be used instead of the ones used on the various details shown on this sheet

·GENERAL·NOTES
In appearence Type "D" Doors resemble solid panel Communicating Doors. Finish - Mahogany or any special finish that may be desired. Erected to steel Bucks and fitted with 3 point Lock and steel butts this door bears label of National Board of Fire Underwriters, and at present is the only hollow steel door approved by them for Fire Wall Openings

·FLUSH·TYPE·DOOR·NATIONAL·HOSPITAL·BUREAU·
·SIMILAR·ONE·IN·MT·SINAI·HOSPITAL·NEW·YORK·
·ARNOLD·W·BRUNNER·ARCHITECT·NEW·YORK·CITY·

·PLAN· THRU ·JAMB·
Showing treatment where limited space does not permit the use of trim

·SECTION·HEAD·
Jamb section same without reinforcement.

·CORRIDOR·&·COMMUNICATING·DOORS·EQUITABLE·BLDG·
GRAHAM, BURNHAM·& CO ARCHITECTS, NEW YORK, N.Y.

# ·EMPIRE·ART·METAL·COMPANY·

·COLLEGE POINT· ·NEW YORK· ·U·S·A·

POMEROY FIRE RETARDANT WINDOWS

**Let Window Efficiency Be Your Measure of Window Value**

For fire safety, BE SURE the window is efficient as a fire retardant. And for investment value, earning power, rentability and comfort qualities, BE SURE it is efficient as a window. The Underwriters' Label is an index to fire retardant efficiency—it stands for fire safety. But for efficiency in the larger sense, as affecting permanent building values, look to the standards, the methods, the responsibility of the window manufacturer.

**For 20 years, POMEROY WINDOWS have been "made not to meet a price but to set a standard of service." They are the physical embodiment of high window efficiency. They have earned the confidence of architects and the approval of builders. They have proved themselves to be positive factors in permanent building values.**

***POMEROY WINDOWS are made in more than 20 standard types, that you may have POMEROY Quality whatever your class of window service.***

SAMPLES FILED WITH ARCHITECTS' SAMPLES Co NEW YORK CITY

**S. H. POMEROY COMPANY, INC.**
30 EAST 42ND STREET NEW YORK

The building laws of many states recognize plaster over metal lath as suitable construction for fire resisting stair soffits and walls in factories, stores, etc.

**Kno-Burn**
TRADE MARK
**Expanded Metal Lath**

is the *standard* lath for all types of construction. Its fine mesh cuts down the amount of plaster. Its smooth surface is easy and quick to plaster over. Its mesh keys the plaster firmly and permanently to it.

Let us send you complete data on our full line. Ask for Booklet 583.

**North Western Expanded Metal Co.**
***Manufacturers of all types of Expanded Metal***
**958 Old Colony Bldg., Chicago, Ill.**

**REYNOLDS**
**FIRE SAFE**
APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS
TRADE MARK H.M.R. ESTABLISHED 1868
**SHINGLES**

TESTED by the Underwriters laboratories under their standard tests, Reynolds Shingles have proven themselves worthy of classification as fire preventatives.

Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

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**"Originators of the Asphalt Shingle"**
**Grand Rapids MICHIGAN**

# CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF FIREPROOFING MATERIALS & PROTECTIVE DEVICES

C. Stanley Taylor, Editor-in-Chief
Bruce E. Loomis, Ins. Eng. Editor
Samuel G. Webb, Technical Editor
Wm. Wallace Ewing, Consulting Eng.
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William Law Bowman, Legal Editor
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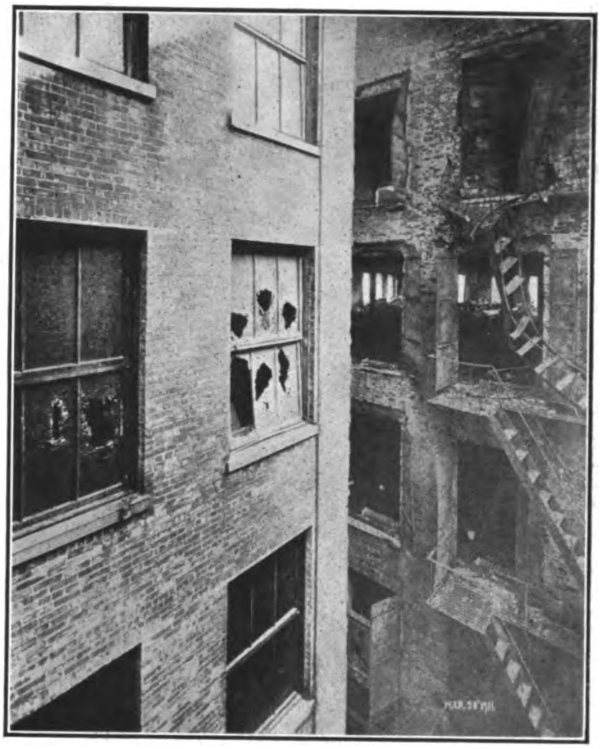

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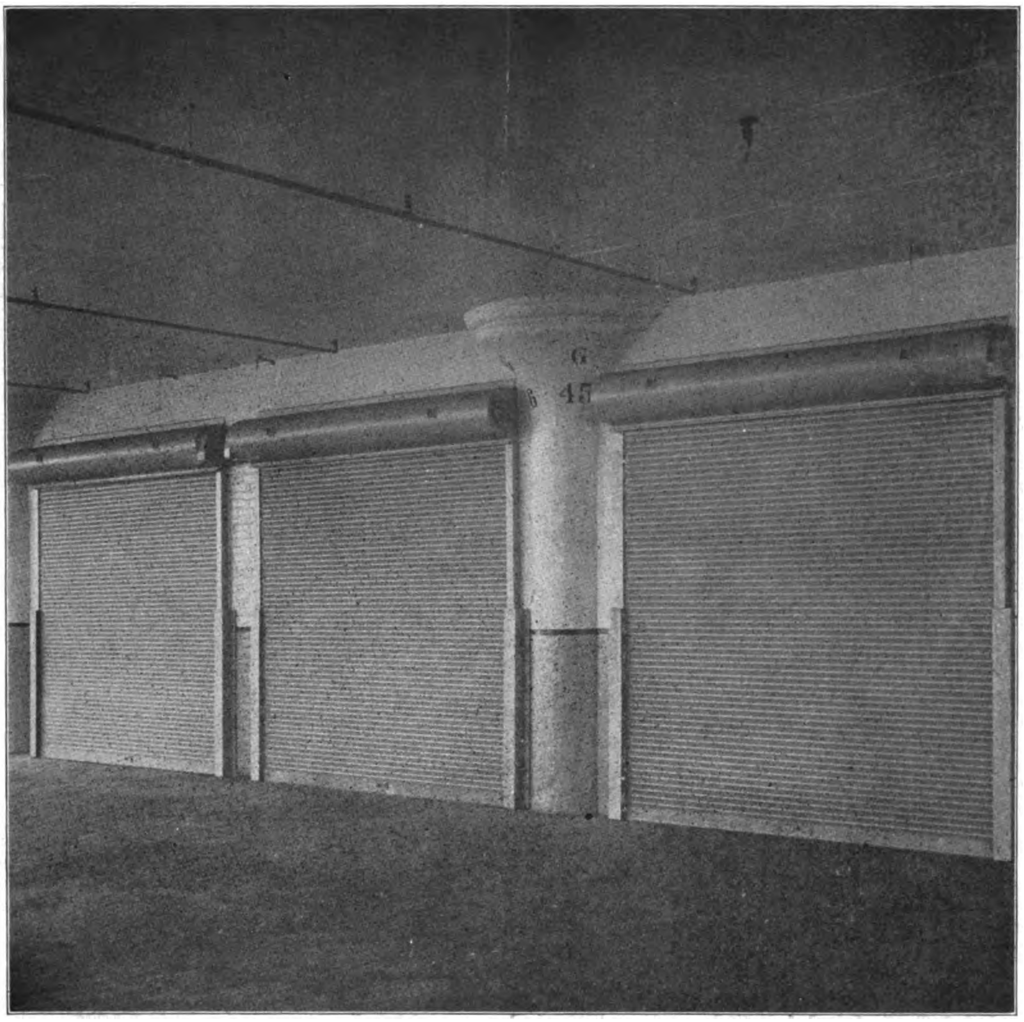

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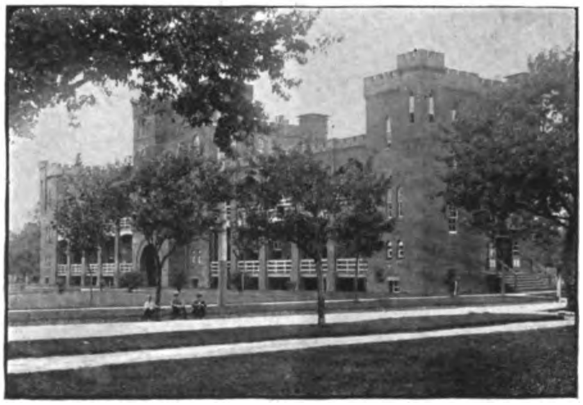

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*Parkway Hotel, Garfield & Lincoln Parkway, Chicago, Ill. Walter W. Ahlschlager, Chicago, Architect. G. H. Gottschalk, Chicago, Contractor. 610 tons of Natco Hollow Tile furnished.*

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## for Hotel Efficiency

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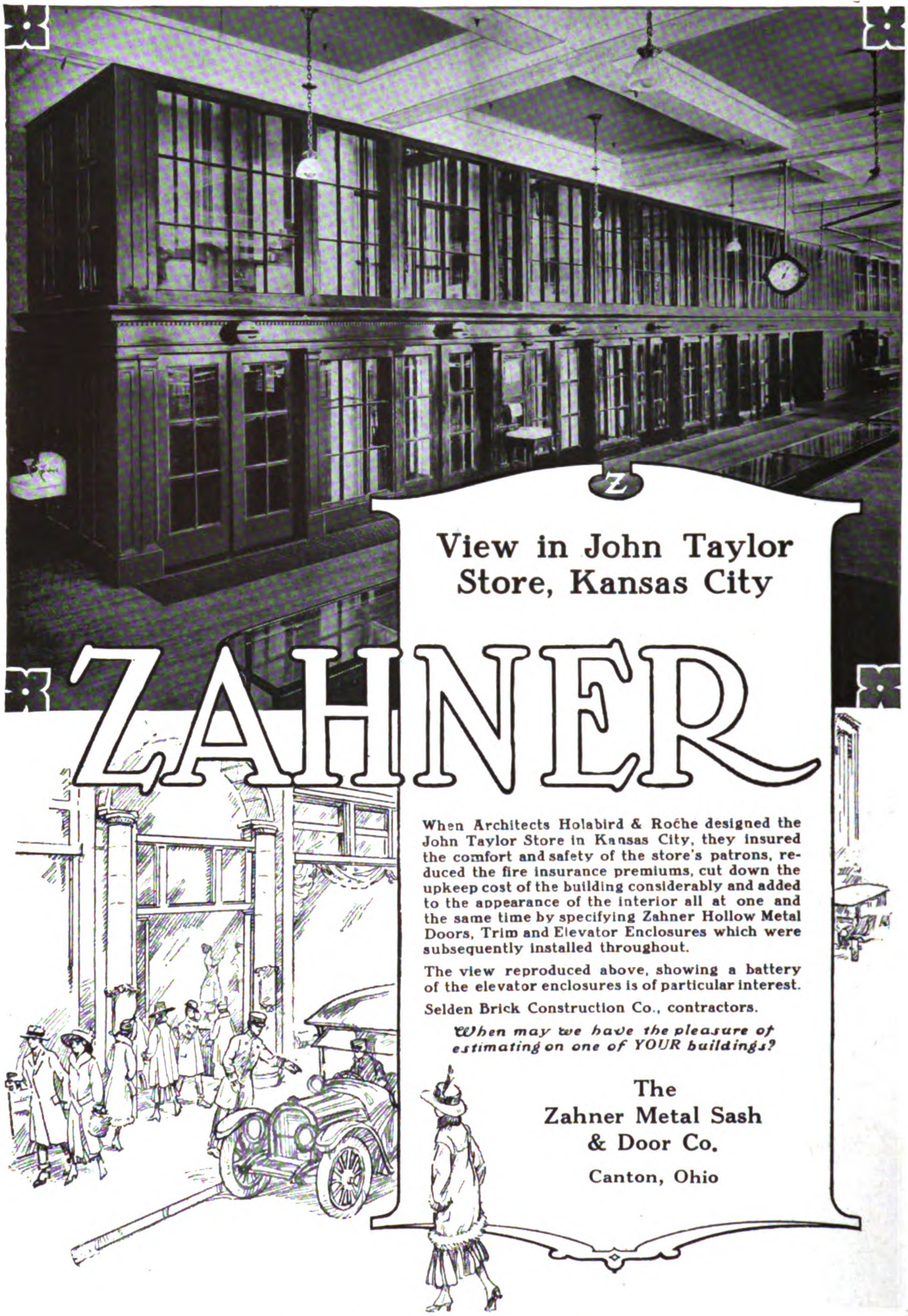

View in John Taylor Store, Kansas City

ZAHNER

When Architects Holabird & Roche designed the John Taylor Store in Kansas City, they insured the comfort and safety of the store's patrons, reduced the fire insurance premiums, cut down the upkeep cost of the building considerably and added to the appearance of the interior all at one and the same time by specifying Zahner Hollow Metal Doors, Trim and Elevator Enclosures which were subsequently installed throughout.

The view reproduced above, showing a battery of the elevator enclosures is of particular interest.

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Fire

Falling Walls

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This book contains details of scientific tests and actual experiences that have placed THE SAFE-CABINET on a plane of its own.

See the signed statements of SAFE-CABINET owners whose records were saved in fires where other means failed.

Don't be one of the class who must be awakened by destruction—**act now.** Get this book and determine your own safety. It's an old, old story, but "tomorrow may be too late," may apply to **you.**

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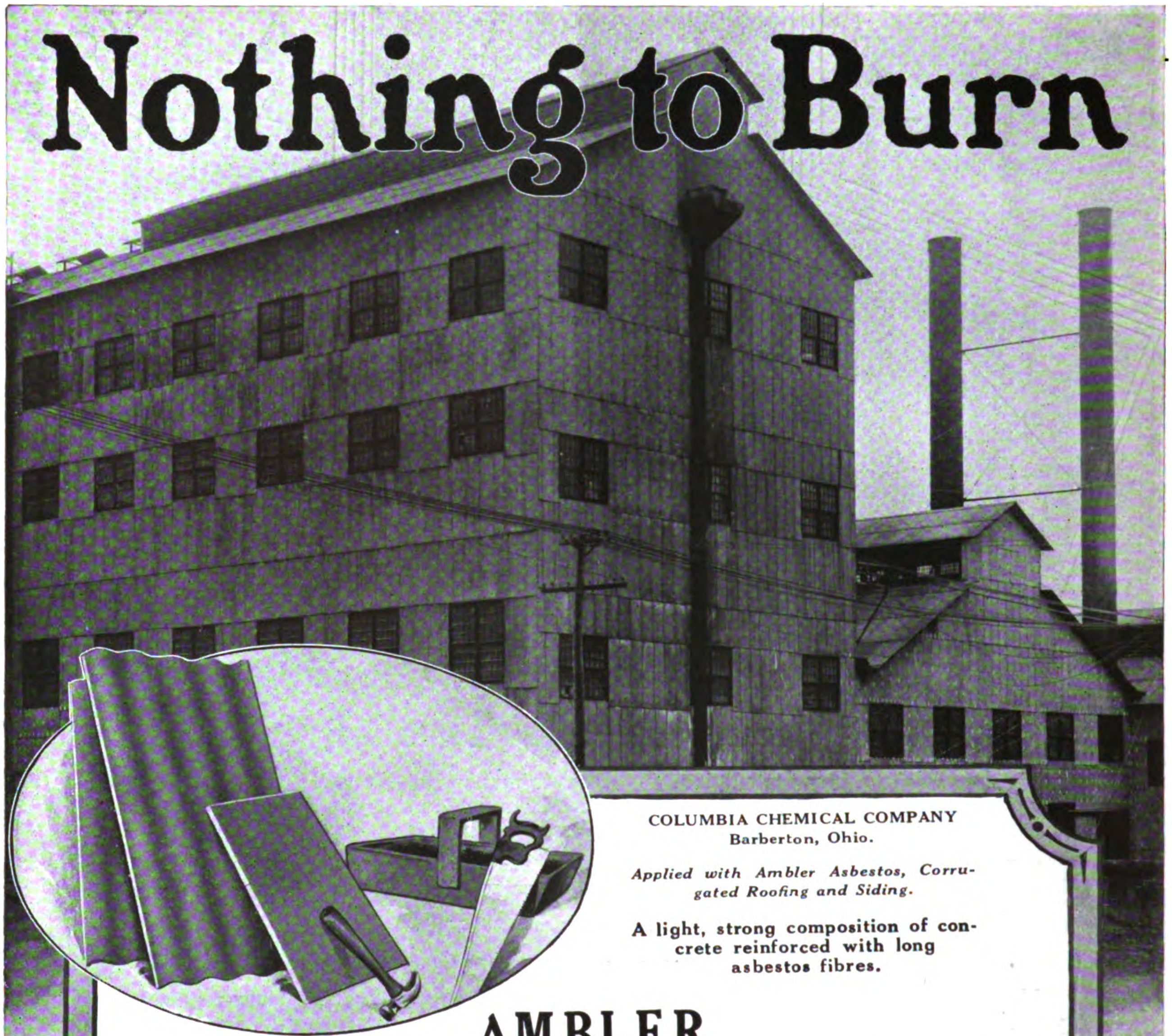
Business....................................................

Address.....................................................

(Shall we send information on THE SAFE-CABINET for home use?)

# Nothing to Burn



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CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. IV JUNE, 1917 No. 6

## *A National Building Policy*

CONSTRVCTION believes wholeheartedly in giving worth-while service to its readers and advertisers, but, more important of all, the people of our country by fighting for, in season and out of season, more fire-resistive buildings and better protection of the persons and property housed therein. CONSTRVCTION believes that the many efforts of institutions, individuals and legislative enactments, will produce the quickest and greatest good in lessening fire waste if such efforts are correlated and if they are directed into similar channels and ways and with similar definitive objectives.

CONSTRVCTION, as the national organ of those interested in any manner in the subject of safer and better building construction, asks only that developments in this work be not buried in the archives of individuals and associations, but that the records of tests, new ideas and actual practice be made available to the public through its pages for proper co-ordination and use in the general educational propaganda undertaken. Let there be an interchange of thoughts and ideas, of suggestions or criticism from which there may evolve the proper specifications for the construction of the buildings of a nation.

The policy of CONSTRVCTION and its activities must not be interpreted as a bitter fight against wood or against any other building material. It is a fight against the wrongful use of any material from the standpoint of safety against fire. Where wood can be used with impunity, or protected in a manner to eliminate potential fire hazard, by all means let wood be used if it offers inducements in the way of convenience, price or permanency. Let this effort to reduce the national fire waste be placed on a broader basis than that of class distinction or the animosities as existing between manufacturrs of competing materials.

There are building materials which are inherently of a nature resistive to fire. Where the exposure hazard exists, as a matter of common sense, let us use these materials for the protection of our lives, our goods and our investments. There are devices which, through the ingenuity of man, have been designed to detect and extinguish incipient fires. Where there exists danger of such fires, as a matter of common sense, let us install those devices.

There are certain uses of inflammable building materials, such as the roofing of dwellings in fairly congested communities, which create paths along which a conflagration does and will travel. As a matter of common sense, let us realize the danger and use fire-resistive and fire-retardant materials which are available for this purpose.

There are uses, especially in dwellings made of wood and wood shingles, for the finished surfaces of outside walls, which in congested areas or where such buildings are placed fairly close together the conflagration hazard exists. As a matter of common sense, at least let the outside surfacing of the exterior walls of such buildings be incombustible.

In the interiors of frame buildings the exposed wooden framework in the cellars and attics form a constant menace of fire to such buildings. By using incombustible lathing and plastering over such exposed framing such menace would be removed. If in addition to this, proper cut-offs are provided at the floor levels in the walls and partitions, such building is becoming worthy of some degree of recognition as fire-resisting, even if the studs, joists and framework are all of wood. Protect such wood from incipient fires and prevent fire traveling inside walls and partitions and between floors.

Let us go further than this. Let us legislate nationally and locally the application of common sense in the matter of building construction to enforce safer and better buildings for the sake of the individual and the community.

We have pointed out before that it is axiomatic that if buildings were constructed of materials which would not burn or support combustion, and if the contents of such buildings were also incombustible or protected against burning, then there could be no fires.

The nearer we approach this ideal condition the nearer we come to the complete solution of the fire waste problem—to the eradication of fire waste and the prevention of all fires.

It is by no means Utopian to reach after this ideal condition. CONSTRVCTION, with a full realization of the significance and importance of the statement, believes—

THE FIRE WASTE OF AMERICA CAN BE STOPPED
BY THE ADOPTION OF
A NATIONAL BUILDING POLICY.

## Fire Retardant Windows

ON another page of this issue is published the first section of a paper on "Fire-Retardant Windows," which will be continued serially in our next number. In presenting this long article to our readers in this form, we are influenced by the fact that this is—so far as our knowledge goes—the first comprehensive and complete analysis of fire window efficiency ever made. Mr. Pomeroy's identification with the fire-retardant window business from its very inception qualifies him to speak on the subject with the authority of an expert. Hence, though his paper transcends in length our customary space limits, we feel that it deserves publication in full, even in serial form, for it could not be condensed without sacrifice of some of its essential features.

"Window Efficiency" is a term which, we believe, originated with Mr. Pomeroy, and for which the building world is indebted to him. It is to be hoped that it will serve to focus the attention of architects, contractors, owners and operators upon the window as a factor in the economics of building and building management.

## Practical Benefits Follow Fire Hazard Reduction

IN Frank W. Keller, South Bend, Ind., has a mayor who appreciates that the proper way to secure municipal reforms is to improve underlying conditions, and to do this in a sensible, businesslike way.

Among other benefits desired for his city by Mayor Keller was a reduction in its fire insurance rates. How this was accomplished is thus tersely set forth in Mr. Keller's third annual message to the people of South Bend:

"In order that cities may be properly planned and buildings so constructed as to promote health and reduce danger and loss from fire, new restrictions and methods are necessary.

"These provisions are embodied in the new building code adopted last year, It includes the very latest ideas and requirements as to construction, and permits regulation as to location of certain classes of structures.

"In order to enforce the requirements of this code a building department has been created under expert supervision. This department will be largely supported by the fees received for building permits. While the code may require revision from time to time, we are confident that it is at present as complete and modern as any that can be found which is adapted to a city that is the size of ours.

"The adoption of this code was one of the means whereby a better insurance rating was secured for the city."

## Will the Lesson Be Heeded?

SEVERAL pages in the issue of CONSTRVCTION are devoted to reviewing the conflagration at Atlanta, Ga., on May 21 last, the direct property loss of which exceeded $5,000,000.

The one redeeming feature in connection with the disaster was the alacrity and unanimity with which the city council adopted a sweeping ordinance prohibiting the continued use of wooden shingles for roof coverings—the responsibility of this form of hazard for the spread of the fire from its point of origin having been clearly recognized.

Of pronounced interest in connection with the admirable review of the conflagration by the experts of the National Board of Fire Underwriters is the assertion that: "Most American cities, towns and villages are in danger of conflagration, and conditions in them are worse than those of Atlanta. A great disaster serves to focus attention, but fires which virtually wipe out small communities are so freqent as to pass unnoticed."

The municipal official who fails to appreciate the fire menace to his community of closely-built frame structures, roofed with wooden shingles, and who neglects to use his whole influence in favor of brick, terra cotta, cement or other fire-resistive building material, is negligent of the trust reposed in him, and should promptly retire or be retired to private life.

## Hollow Tile Men Active

PLANS for prosecuting a more intensive campaign in the interest of their product were determined upon by manufacturers of hollow tile at a gathering in New York city early in June. Permanent headquarters have been located at Chicago, from which point the secretary of the Hollow Tile Manufacturers' Association, E. R. Sturdevant, will keep in touch with the work of the various sectional hollow tile organizations throughout the country. Never was the time for prosecuting an intelligent campaign for firesafe structural building material more opportune than the present, a fact recognized apparently by hollow tile manufacturers.

## Constrvction's Technical Editor

Samuel George Webb

WE are happy to announce that Samuel George Webb has joined the editorial staff of CONSTRVCTION in the capacity of technical editor.

That Mr. Webb is a valuable acquisition to and will add strength, purpose and high usefulness to the publication, its audience and advertisers, can best be illustrated by a brief sketch of his career.

He spent his early life in England and received a technical education in chemical engineering at Finsbury Technical College in London. After leaving college he was engaged for nearly six years as chemist and works manager in one of the plants of the United Alkali Company in Lancashire. These duties involved directing the doubling of the size in buildings and equipment of the plant and the development and manufacture of specialized products for the home and various foreign markets. This experience gave Mr. Webb an excellent practical training in enlightened pioneering business methods and in mechanical construction and chemical engineering.

Believing in the motto *"Mens sana in corpore sano."* Mr. Webb found time to engage in athletics and in military duties, and held a commission in an infantry regiment of the volunteer auxiliary forces of the British Army for over five years, resigning his commission on leaving England.

He came to America in 1892 and has identified himself with professional and business activities in this country during the entire past twenty-five years.

He acquired an intimate knowledge of the manufacture and use of Portland cement through first engaging in the scientific testing of cement used on important railroad undertakings. He then became engaged in the design of a Portland cement plant and afterward in the design of concrete structures. From this he passed into the commercialized and development field of Portland cement and concrete, at the time when concrete was struggling for recognition of its merits. He subsequently engaged in the work of broadly developing the uses of gypsum and has only recently relinquished the directorship of the Gypsum Industries' Association. Our readers will have doubtless noticed the "Gypsum Section," which Mr. Webb has conducted in this magazine for many months.

Mr. Webb has long believed that co-operation should exist among the producers of materials, protective devices and completed buildings, to bring about the construction of better buildings and, particularly, to improve the existing fire waste conditions. He has been working long and faithfully to bring about such co-operation for the good of producers and of the country at large, with a considerable measure of success. He was a factor in the co-operation by conferences between the principal scientific bodies in this country and Canada and the fire underwriters and the Federal Government. These conferences have studied and adopted tentatively a standard time temperature curve and other fundamental principles in fire-testing materials of construction (see May, 1917, CONSTRVCTION). He has fought for the establishment and acceptance of a national policy in building matters. In this connection our readers are referred to an exhaustive article which appears in this number of CONSTRVCTION.

Mr. Webb serves on many committees of a nationally important character, dealing with different phases of structural questions approved by the Federal Government and various technical societies.

He has been a frequent contributor to technical magazines and has also preached the gospel of fire resistance and fire protection and better construction, by word of mouth, on frequent occasions from the lecture platform.

We believe our readers will agree with us that Mr. Webb, at the half-century of life, brings to CONSTRVCTION a ripened and broad experience for dedication to the cause of improvement of buildings and conservation of much of our wasted resources by fire loss, and that the propaganda to which this publication is committed will be distinctly the gainer because of his association therewith.—C. Stanley Taylor, Editor-in-Chief.

# No Commandeering of Building Supplies

SENSATIONAL reports in the daily press as to the alleged purpose of the Federal Government to commandeer structural steel and other basic building materials greatly excited the building fraternity a short time ago. Fortunately the story has no foundation in fact, and doubtless arose from the inquiries made from Washington of steel manufacturers as to the supply of plates they would be able to furnish for war and merchant vessel construction.

Discussing the report, the Dow Service Daily Building Reports of New York city a short time ago was able to reassure its subscribers with the following positive statement:

"Upon high authority the statement can be unqualifiedly made that no general commandeering of either steel or lumber plant capacities in the United States is to take place. The original report had to do with the possible action this country could take should the present plans of the shipping board prove to be ineffectual. The plan to take over all the steel plants of the country and all the lumber mills was only considered as a possibility arising from the most extreme sort of emergency.

"Every steel and lumber manufacturer in the country worthy of the name is not only pledging his support to the proper authorities at Washington, but is actively and eagerly co-operating with the various departments in meeting national requirements. The steel manufacturers, especially those rolling large orders for the domestic trade, have given the Government every right of way through their plants, and the Government requirements only total between five and ten per cent of the country's steel rolling capacity. This represents a pushing back of domestic tonnage from three to five months and deals primarily with heavy tonnage for bridges and buildings secondarily and similar work.

"A canvass made by the Dow Service Daily Building Reports of the various stores out of which supplies come to builders for moderate-sized operations, last week, showed that there were fairly good stocks of steel on hand, sufficient to take care of moderate-sized building requirements for the balance of this year at least. On orders for large buildings, which have to be rolled on specification at the mills, delays ranging from eight to twenty months, depending upon tonnage and specification, may be expected, although new steel capacity is being rushed to relieve this pressure. This delay includes estimates for structural steel business now pending or being figured, and also includes the setting back of orders approximately five months to give the Government requirements prior place in the mills.

The threatened engrossment of 1,500,000,000 feet of shipbuilding lumber is not a serious factor, because it does not affect general building lines to an extent making for general stagnation in construction. The lumber trade looks for some further reflection as far as prices are concerned, but increased orders for fireproofing material and other lumber substitutes are expected to further stimulate the tendency to proceed after small building operations running as high as six stories.

"This disposition is further encouraged by the fact that common brick prices are remaining steady at $10 wholesale and that basic materials, like sand, gravel, glass, asphaltum, plaster, metal lathing, expanded and wire lath Portland cement, roofing materials and front brick continue to remain steady at or near present levels. There is also noted a considerable tendency to concentrate on building alterations. Careful daily surveys of the suburban districts show that the big building movement of the hour is outside of New York city, where steel and metals constitute an important factor in construction. In cities like Newark, Paterson, Passaic, Elizabeth, Plainfield, New Brunswick, Perth Amboy and territories in Westchester and Orange counties and Long Island, there is a volume of new construction comparatively far in advance of that of New York city.

"One important building material supply house holds the view that this suburban building movement and the increasing alteration work going on in the city will be sufficient to keep this market practically normal far into the winter. Another important building material manufacturer, representing one of the largest industries in the building material line, which called in its salesmen three weeks ago, because it did not care for any new business, is sending them out again to-day covering the suburban fields in the vicinity of New York, Boston and Philadelphia.

"This particular company has assurances that it is the disposition of the Government not to check industry by stifling demand, but to keep the materials going and to encourage realty interests to improve their property to help the national building industry meet its share in the financing of the great war."

## Minnesota Fire Losses Increase

DESPITE the activity of the State Fire Marshal the fire losses in Minnesota during April were considerably larger than during the corresponding month of 1916. The need for increased care on the part of property-owners, and more particularly the desirability of better construction practices, is constantly being emphasized.

# Fire Retardant Windows*

By S. H. Pomeroy

THE paper on the subject of wire glass, presented by Messrs. Hardy and Chapman at the June meeting of the New York chapter of the National Fire Prevention Association, deserves place among the classics of fire prevention literature. It seems to me that, in that paper, wire glass was for the first time accorded its just measure of recognition as a factor in reducing fire losses, as a money maker for insurance companies, as an aid to fire departments, and as an influence in ultimately reducing the premiums that owners are called upon to pay.

I have but one criticism to make upon that paper—and perhaps no one but a crank on window-making would find grounds for even this one exception. I refer to the impression which I received, that the article does not clearly differentiate between wire glass and wire glass windows. I fear that a casual reader of that article might gather the impression that the whole virtue of wire glass windows lies in the wire glass itself; whereas all who are window-wise know that wire glass without the support of proper sash and frames is a delusion and a snare.

True, wood frames and sash with wire glass have better fire retardant qualities than the same frames and sash with plain glass only. But fire prevention isn't a question of getting something that is simply better than no protection at all. It is a question of getting the utmost possible in the way of fire protection. And, in the case of fire retardant windows, that means wire glass carried in hollow metal sash and frames of sound and substantial construction.

Without giving offense by lack of modesty, I may claim to know whereof I speak, in matters of window work. For, with my former partner, Mr. Voigtmann, I produced the first hollow metal fire retardant window offered as a commercial article for the consideration of insurance authorities. This was in Chicago, in 1897. The specifications of that first window—filed with the Chicago Board of Underwriters—were incorporated by the insurance authorities in the rules issued for the subsequent guidance of their inspectors in passing upon metal window work. And I think I am right in stating that those original specifications have since, in all essentials, defined the standards by which all metal windows offered for approval have been measured.

I do not mean that there have not been vast improvements made since that first window appeared. I do mean that that original hollow metal window embodied most, if not all, of what are still recognized as the essential features of a safe window. For instance, the minimum size of glass, and the dimensions of jambs and sash work, have been little changed. The lock seam and lock joint in the metal structure are still standard. And the passing of years seems only to establish their correctness more securely.

Let us not forget that wire glass, with all its virtues, is effective as a fire barrier only so long as it is intact and in place. Then the window construction is seen in its proper light—not as a thing secondary to the glass, but as something of more importance even than the quality of the glass. Sash and frames must have a resistance to fire at least equal to that of the glass, if the window is to be considered as a fire retardant—which statement determines what we may call the lower limit of window quality.

Going beyond this, in our seeking for safe and efficient construction—if we can produce sash and frames that will stand up as units even after the wire glass has been so shattered as to necessitate replacement, that will so far retain their integrity under the ordeal of fire as to be ready for continued service, after the fire, with re-glazing and repainting, then we have determined the upper limit of window quality. The average fire retardant window lies between these two extremes. But it is possible to secure, in the open market, windows which closely approach the upper limit of quality. It is simply a question of how much, or how little, protection the owner is willing to pay for.

## Two-Fold Function of Windows

Let us not lose sight of the fact that the efficient fire retardant window is both a window and a fire retardant, and that it must not fail of its functions as a window simply because it is a fire retardant—and vice versa. Let us, then, put our thoughts in order at this point by briefly defining the two-fold functions of such a window.

As a fire retardant, the window must offer the maximum resistance to the passage of fire through the opening it protects; it must maintain this fire resistant quality up to the point of physical destruction; without being structurally weak, it must still permit a fireman, in emergency, to make a passage through it; it must be so devised or equipped as to close automatically, should the outbreak of a fire find it open its hardware must be of a character and quality that will not deteriorate with time.

Considered now as a window, this fire retardant must afford the largest possible percentage of lighting area; it must afford the greatest opening possible, for ventilating purposes; when closed, it must have good weathering qualities without the use of weather strips; it must be easily opened and closed by those who must live with it; it must be so well designed and so substantially built that it will be largely depreciation-proof and capable of fulfilling its many functions for an indefinite period, with the minimum of attention and up-keep.

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* Address delivered before recent gathering of New York Chapter of the National Fire Prevention Association.

It will be well, at this point, to set forth clearly the relation which the Underwriters' Laboratory has to fire retardant windows, and the responsibility which that organization assumes. For a misunderstanding on this point may lead to serious difficulties and disappointment.

### Underwriters' Standards

About 1900, the Chicago Underwriters rearranged and issued in pamphlet form the specifications of the original Voigtmann window, already referred to. The rulings of this pamphlet governed in the insurance world, as regards window work, until about 1906, when the Underwriters' Laboratory adopted a form of procedure governing the manufacture of fire retardant windows which has since been known as the Label Service.

In other words, prior to 1906 the Underwriters' rulings on fire retardant windows were largely arbitrary and based on assumptions rather than on known facts. But in 1906 a more definite standard was created, based on actual performance under the fire test. Without going too much into the detail of these Label Service tests, it may be said that each approved window must withstand without failure exposure for one hour in a gas combustion chamber at 1800 degrees Fahr.; after which it must withstand the effects of a stream of water at 60 lbs. pressure from a 7-8-inch nozzle.

Be it clearly understood that Label Service deals with a window only as a fire retardant, and has nothing to do with its functions as a window. It is simply a guarantee that one window of the type purchased by a buyer has been approved by the Underwriters' Laboratory after cetain fire retardant tests, and that every window of that same type which bears the label has been locally inspected and found to conform with the window tested as to design, construction and weight of metal.

Each label has its individual number, which is recorded at Chicago, with the description and location of the window to which it is attached. And in case of failure of one of these windows, this record can be looked up and responsibility placed. The Label Service is an excellent thing but by no means infallible. For instance, while it requires a construction giving 5-8-inch bearing for the glass, it leaves it to local inspectors to see that this demand is fulfilled. It is a safe guide to fire protection, because a window which cannot pass the tests of the Label Service cannot be considered as a dependable fire retardant. But while it is a guarantee of good fire retardant qualities, it is no guarantee of a good window.

It is to be regretted that there is no explicit definition of a fire retardant window. In a sense and up to a certain point, a window of slow-burning wood carrying wire glass is a fire retardant. Going up a little in quality, we come to the metal-kalameined (metal-covered wood) window with wire glass, which is still more of a fire retardant. Next in order comes the window of structural steel members carrying wire glass—also fire retardant up to a certain point. Last comes the hollow metal window with wire glass, which has proved to have a fire resistant and retardant quality higher than any of the other types.

About the best than can be said of the slow-burning wood construction with wire glass is that it is better than a window of untreated wood carrying wire glass. Just how much better can be determined only when the adjuster fixes the damages—at which time the information is of little value to the one who bears the loss.

The metal-kalamein window goes a step better in its fire resistant qualities. But it is apt to give a sense of false security. It is dependent for its mechanical strength upon the wood structure underlying the veneer of metal—and no one knows at any time just what the condition of that wood is. It may be sound—or it may have become reduced to "punk." If the metal used is subject to corrosion, it may be reduced to paper-like thinness. And, when the test comes, the whole window may collapse almost with the first blast.

The structural steel window deserves more serious consideration—and it will here be accorded it. There never was a better window made—for the particular purposes for which it was originally intended, viz., to provide the maximum of lighting area in factory construction. This use of a lattice of light stock structural shapes carrying a multitude of small panes of plain glass, permitted a strong and durable construction to be made at a remarkably reasonable cost. And ventilation was easily provided by making a portion of this lattice work movable.

So successfully did this structural window fulfill the conditions for which it was designed that it really brought about a new form of factory construction in which the wall area is practically all window area. But, like a number of good things, it has been overdone and burdened with responsibilities for which it was never intended or adapted.

Merely to substitute wire glass for plain glass in a structural window will not make it an effective and dependable fire retardant. True, it will be composed of non-burning materials; but it by no means follows that it will, as a unit structure, maintains its integrity under fire temperatures and fire streams.

When structural steel—even in heavy sections—is used elsewhere in fire proof buildings, it is enclosed in concrete or masonry to protect it from the warping, twisting, distorting effect of excessive temperatures followed by sudden cooling. Can the light steel members in this structural window, when exposed without any protection whatever to the full blast of fire and fire stream, be reasonably expected to stand up without injury? They have not done so, under the Underwriters' tests.

The insurance rules require that the mullions between adjoining approved fire retardant windows shall be of heavy steel encased in a fire-proofing material. Contrast this—from the standpoint of safety and dependability—with the common practice in structural window work where great elevation areas are composed entirely of this flimsy steel-and-glass structure. There is, indeed, grave danger that over-enthusiasm on the merits of the structural window may lead to its use in such large areas that the safe relation between window space and pierage-and-curtain-wall space may be lost, and a building designed which, when the windows fail under fire, will be not only gutted but actually destroyed.

Furthermore, the structural window offers no opportunity for the passage of a fireman when necessity demands. Its movable portion is usually high up and out of reach. Its individual glass openings are too small to give passage to a man. And the metal structure is too solid for a fireman to smash an opening through with this axe.

In its usual forms the structural window can be built at a cost which prohibits competition between it and a high-grade hollow metal Label retardant window. For instance, its rames and mounting are stock shapes needing only to be cut to length and fastened together. Manufacture is mere fabrication. It uses small panes of glass which, as everyone knows, can be bought at much lower unit cost than the larger size panes required by Label Service.

Yet, at relatively low cost, a good window can be made in the structural type—if one cares to ignore the weather qualities resulting from the small size of members and the small glass-bearing surfaces. But when it is attempted to make this window a dependable fire retardant according to Label Service standards, costs mount to discouraging figures.

### Construction of Hollow Metal Window

There remains to us, then, in our seeking to make our window openings fire-safe, the window of hollow metal and wire glass—the one window designed and constructed primarily to give maximum fire protection combined with high window efficiency. Be it here recalled that this type of window consists of thin sheet metal pressed to shape and assembled in a form which encloses—both in sash and frame—a dead air space. Instead of solid metal affording splendid heat conductivity, we here have thin metal walls with air on both sides. While air is not the best conductor of heat, it is still sufficiently effective in this respect to prevent the communicating of ignition temperatures by the thin metal of the window. In the fire test conducted by the Underwriters' Laboratories on hollow metal windows, it is noted that while the side exposed to the fire may be a cherry red, the other side remains at normal color.

The action of the hollow metal wire glass window, as a fire retardant, is that of a heat insulator preventing the transmission of a destructive heat from the fire-exposed side to the side not so exposed. Its dependability as a fire retardant rests upon two things, viz., its heat-insulating qualities, and its ability to maintain its physical integrity under the fire test.

Let us not, therefore, be led into a mistaken belief that every hollow metal wire glass window is a safe fire retardant window—for it isn't. Cheap, tinker construction in light, flimsy metal carrying wire glass doesn't make a dependable fire retardant window. It may look—to the uninitiated—like a Label window, but the fire test will prove its worthlessness. The grave danger is that the presence of these makeshift hollow metal windows in a building may give a false sense of security that nothing but disaster can dispel.

The factors involved in the tests prescribed by the Underwriters' Laboratory to secure Label Service are: thickness of metal; method of securing members in place; provision for expansion and contraction; bearing of glass in sash; rigidity of structure in resistance to distortion under heat.

It will be evident from this that the insurance authorities concern themselves only with the fire protective properties of the window and that—so long as Laboratory requirements are satisfied—"any old thing" in the way of a window can pass. And this is most unfortunate. For—without underestimating the importance of fire resistant quality—it must be admitted that only an actual fire can prove the extent to which this has been provided by the maker; while the day-after-day qualities of the window as a window determine whether it is a good window or a poor one, from the standpoint of buyer and user. For fire retardant efficiency is only one factor in window efficiency.

It is commercially possible to make a fire retardant window that is to all practical intents perfect both as a fire barrier and as a window. But until recently it was quite impossible to sell such a window—the market for it did not exist, except in the visions of the best window makers.

*(To be concluded in the July issue)*

*Read* CONSTRVCTION *and keep pace with the best building practice and thought.*

## *Automatic Sprinklers at Los Angeles*

PROPERTY-OWNERS at Los Angeles, Cal., are busy carrying out the provisions of an ordinance adopted by the City Council sometime ago, requiring the installation of automatic sprinklers in all basements where certain designated inflammable goods are stored. This desirable safety measure, adopted at the recommendation of Chief Engineer Archie J. Eley, reads as here given:

"It shall be the duty of the Chief Fire Prevention Engineer, and he is hereby authorized and empowered to order the installation of approved automatic sprinkler systems, where such automatic sprinklers are not already installed in all basements or basements and sub-basements of all buildings in Fire Districts Nos. 1, 2, 3, 4, in existence at the time of the passage of this ordinance, used in whole or in part for the business of wood-working, or for the business of manufacturing or working upon wooden baskets, rattan or cane goods or articles, or tow, shavings, excelsior, oakum, rope, twine or string, thread bagging, paper, paper stock, cardboard, rags, cotton or linen, or cotton or linen garments or goods or rubber, feathers, paint, grease soap oil, varnish or inflammable fluids; and in any basements or sub-basements used in whole or in part for the business of keeping or storing any such goods or articles; such automatic sprinkler systems to be installed as provided in Section 165 of Ordinance 19,900, and such order shall be complied with by the owner or occupant of such premises or building, within two years prior and after the date of the service of said order, subject to appeal to the Board of Fire Commissioners, who shall within ten (10) days review such order and file their decision thereon, and unless the order is revoked or modified it shall remain in full force and be obeyed by such owner or occupant.

"Any owner or owners failing to comply within two years after said appeal shall have been determined, or if no appeal is taken, then within two years after the service of said order, shall be liable to a penalty as hereinafter stated. The service of any such order shall be made upon the owner or occupant of the premises. Such order may be served either by delivering to and leaving with the said owner or occupant a true copy of the said order, or if such owner is absent from the jurisdiction of the officer making the order, by mailing such copy to the owner's last known post-office address by registered mail.

"The owner or owners of all such buildings shall submit plans for approval to the Board of Public Works for such proposed sprinkler systems, showing the size, capacity and locations of all sprinkler heads, pumps, tanks or pipes, and any other apparatus which is to be used in connection with such sprinkler system, within six months from and after the date of the service of said order and said plans, when approved, shall be stamped by said Board of Public Works to that effect before such systems shall be installed.

"Any person, firm or corporation, owning, occupying, managing or controlling, failing, refusing or neglecting to obey such order, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not more than.......... or by imprisonment in the city jail for a period of not more than..........days, or by both such fine and imprisonment.

"Each such person, firm or corporation shall be deemed guilty of a separate offense for every day during any portion of which any violation of this ordinance is committed, continued or permitted by such person, firm or corporation, and shall be punishable therefore as provided by this ordinance."

## *Protected Against Wooden Roofs*

MERIDIAN, Miss., is the latest municipality to join the ever-growing number of cities and towns throughout the country barring the use of combustible roof coverings within their respective borders.

Effective June 1, 1917, the new safety ordinance of Meridian reads: Be it ordained, "That no building or part of any building or structure shall after the first day of June, 1917, within the city of Meridian, be covered with wooden boards, shingles or other combustible material. Provided, any roof that is deteriorated or damaged not more than 50 per cent, such damaged or deteriorated portion of said roof may be repaired with same kind of roofing as the undamaged or deteriorated part. No wooden shingles, boards or other combustible material shall be placed on any roof of any building or structure within said city of Meridian without first obtaining a permit for same from the City Building Inspector, which shall specify the repairs allowed.

"Nothing in this ordinance shall be construed to prevent the use of wooden rafters of sheeting to which the roof covering may be attached; nor shall any fee be charged for any permit hereby required.

"Any person violating the provisions of this ordinance shall upon conviction be punished by a fine not exceeding fifty dollars.

"That all ordinances or parts of ordinances in conflict herewith be and are hereby repealed."

The wisdom of the action of the Meridian authorities in legislating against the deadly wooden shingle will soon become apparent.

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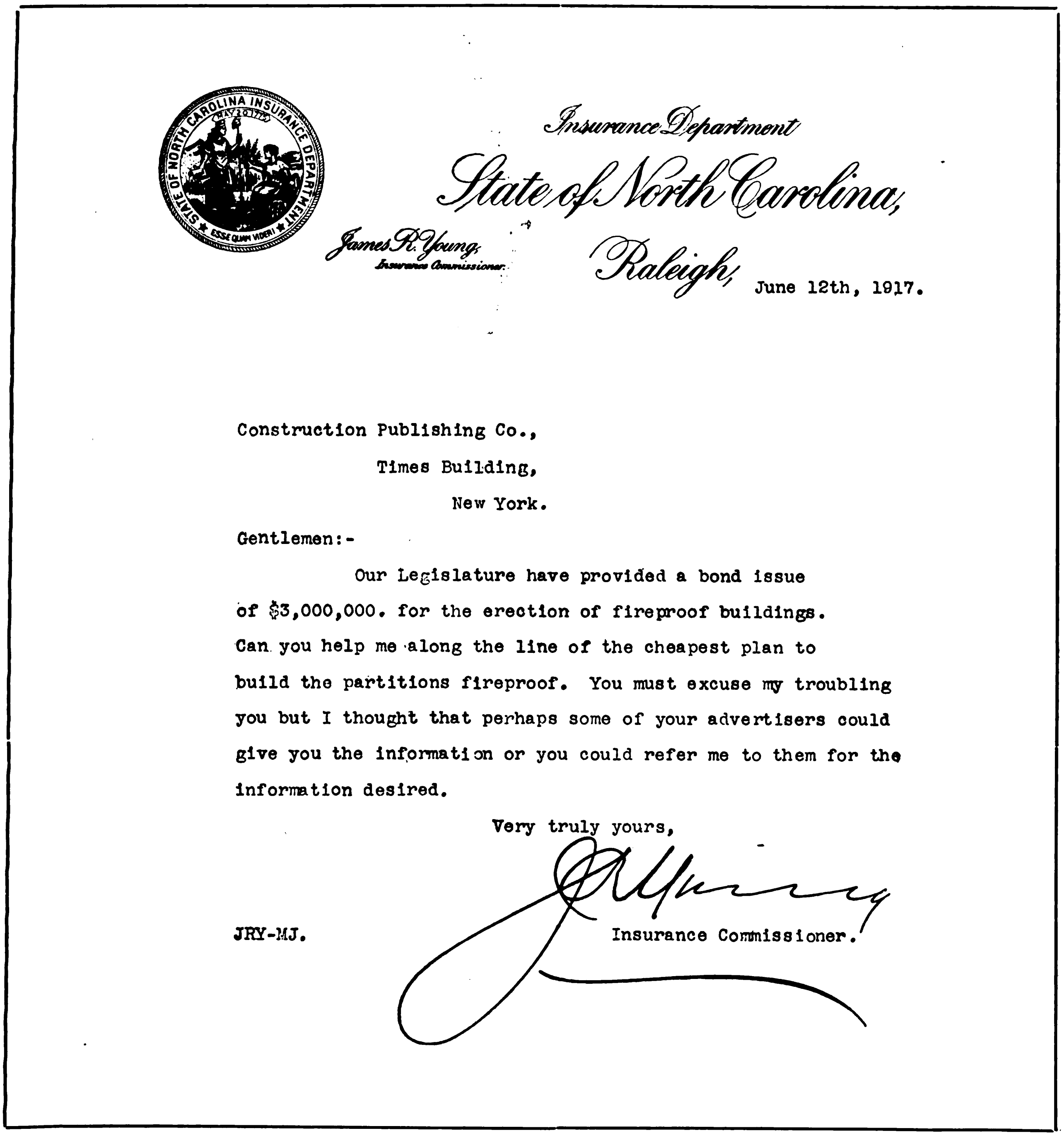
AMONG other improvements recommended for Raleigh, N. C., by President John A. Park, of the Raleigh Chamber of Commerce, is the construction of fireproof public school buildings, "in order that the city's humiliation through their lack shall be relieved."

# *Safeguarding Public Buildings Against Fire*

COL. JAMES R. YOUNG, Insurance Commissioner of North Carolina, has long been known as an ardent and intelligent advocate of safety against fire, and through the activities of his office has done much to reduce the loss record of the Tar Heel State.

Appreciating the power of example, Commissioner Young and other similarly-minded public officials induced members of the North Carolina Legislature, when considering plans for the erection of new State buildings, to insist that these be protected against the fire menace in so far as this is humanly possible.

As attesting the success of Col. Young's efforts, CONSTRVCTION has pleasure in reproducing herewith a copy of a letter received from the Commissioner a short time ago:



Insurance Department
State of North Carolina,
James R. Young,
Insurance Commissioner.
Raleigh,

June 12th, 1917.

Construction Publishing Co.,
Times Building,
New York.

Gentlemen:-

Our Legislature have provided a bond issue of $3,000,000. for the erection of fireproof buildings. Can you help me along the line of the cheapest plan to build the partitions fireproof. You must excuse my troubling you but I thought that perhaps some of your advertisers could give you the information or you could refer me to them for the information desired.

Very truly yours,

J R Young

Insurance Commissioner.

JRY-MJ.

# Atlanta Legislates Against Wood Shingle Roofs

IT required a $5,000,000 property fire loss to induce adoption by the council of Atlanta, Ga., of a sweeping and immediately effective ordinance forbidding the further use within the city limits of the dangerous wood shingle roof.

The provisions of the act which, if properly enforced, will make impossible a recurrence of such a sweeping conflagration as visited the thriving community on May 21st last, are as follows:

Section 1. All buildings except those specifically mentioned in Section II of this Ordinance shall have roof coverings of standard quality, such as—

(*a*) Brick or concrete surface.
(*b*) Clay or Portland cement tile.
(*c*) Tin or slate.
(*d*) Asbestos shingles ⅛ inch thick, or thicker.
(*e*) Pitch or felt, built up type, four or five plies, grave or slag surface.
(*f*) Asbestos-Asphalt, built up type, four or five plies, smooth or grit surface.
(*g*) Other types of coverings having equivalent fire-resisting properties, approved by the Committee of Consulting Engineers of the city of Atlanta.

Section II. All of the following classes of buildings may be covered with coverings set forth above in Section I of this Ordinance, or with Standard Asphalt-Rag-Felt prepared roofing, or Asphalt-Rag-Felt shingles, or by other types of coverings having equivalent fire-resisting properties, which have been approved by the Committee of Consulting Engineers of the city of Atlanta.

(*a*) Dwellings.
(*b*) Frame buildings.
(*c*) Buildings not exceeding two stories, or 30 feet in height and 2,500 square feet in area, and not used for factories, warehouses or mercantile purposes.

Section III. The top and sides of dormer windows shall be covered same as the roof, or with other material having equivalent fire-resistive properties.

Section IV. If a wood shingle roof is damaged by fire more than 20 per cent, the entire roof shall be replaced with material specified in Sections I and II of this Ordinance.

If a wood shingle roof is to be repaired for cause other than damage by fire more than 10 per cent in any one year, the same shall be entirely replaced with materials specified in Sections I and II of this Ordinance.

Section V. The building inspector shall have power to condemn and have removed any wood shingle roof that in his opinion is in such a deteriorated condition as to be excessively inflammable.

Section VI. Within 12 years from the date of the approval of this Ordinance any and all roofs covered with wood shingles shall be replaced with roof coverings which comply with this Ordinance.

Section VII. All ordinances or parts of ordinances in conflict with this Ordinance are hereby repealed.

Before the embers of the fire had cooled the National Board of Fire Underwriters hurried its chief engineer, A. C. Hutson, from New York to Atlanta to study at close range the damage wrought by the fire—the worst in the city's history—and to suggest measures the adoption of which would, in all probability, remove the danger of a similar disaster in future.

**This frame shack is fully half a mile from which were blown the embers that started the conflagration**

After exhaustive study, during which access was freely had to first-hand information—official and unofficial—Mr. Hutson and those associated with him in the work filed their report, which has since been made public by the National Board of Fire Underwriters and from which CONSTRVCTION takes the following excerpts:

### Due Warning Had Been Given

"Atlanta has a population estimated at 196,000.

"In the center of the city, on approximately the highest ground, is the mercantile district. Fire limits, in which frame construction and shingle roofs have been prohibited, barely include this district, and in all other parts of the city, up to the edge of the congested value district, can be found frame buildings with wooden shingle roofs, in many cases in the poorest condition.

"Along the railroads and on the borders of the mercantile and manufacturing section the character of these frame buildings is cheap; they are mostly one-story buildings, closely grouped, with practically no yard-room. Rental of these buildings, which are occupied mainly by negroes, is low, and consequently repairs are seldom made. Plates 1, 2 and 3 show the type of these buildings, but not the condition of many of the roofs, as throughout this area will be found shingles so old and in such poor condition that they are little more than punk; in addition they have curled up on the edges and usually there are innumerable cracks in which sparks can lodge.

Type of wood-shingled roof which afforded admirable fuel for the rapid spread of the flames

"The section where the fire started was of this character, and the first part of the area burned over was a continuation of the same construction. West of the burned area and extending up to and into the business district is an equally bad conflagration spreading district, and until conditions are changed by removing the now existing shingle roofs, there will be an ever-present danger of a far more serious conflagration.

"In the report of the Committee on Fire Prevention of the National Board of Fire Underwriters made on the city of Atlanta in 1909, the statement is made that 'In the shingle-roofed frame residential section there is always a high conflagration hazard,' and again in 1914 the conclusion was drawn that 'the frame residential sections, with shingle roofs, possess the hazard of flying brand fires to a pronounced degree.' The South-Eastern Underwriters' Association has also emphasized this hazard and endeavored to have proper restrictive ordinances passed. The fire department records show a large per cent of fires as occurring from sparks on shingle roofs and the chief of the fire department has repeatedly recommended that such roofs be eliminated. An attempt was made to better conditions in 1916 by the passage of an ordinance applying to roof coverings, but this ordinance, which was to take effect in January, 1917, was later changed to become effective July 1, 1917, and had never been in force. It would at best affect only new construction and would not force existing roofs to be replaced; it permits a repair amounting to 50 per cent of the surface, and a year later a second repair of the other 50 per cent.

* * * * *

### Origin of the Conflagration

"The exact origin of the conflagration can not be determined. From the evidence available, including the general direction of the wind and the fact that a pall of smoke was noticed driving in the general direction of Fort and Decatur streets, it is believed that the conflagration started from sparks carried by the wind from the Woodward avenue fire.

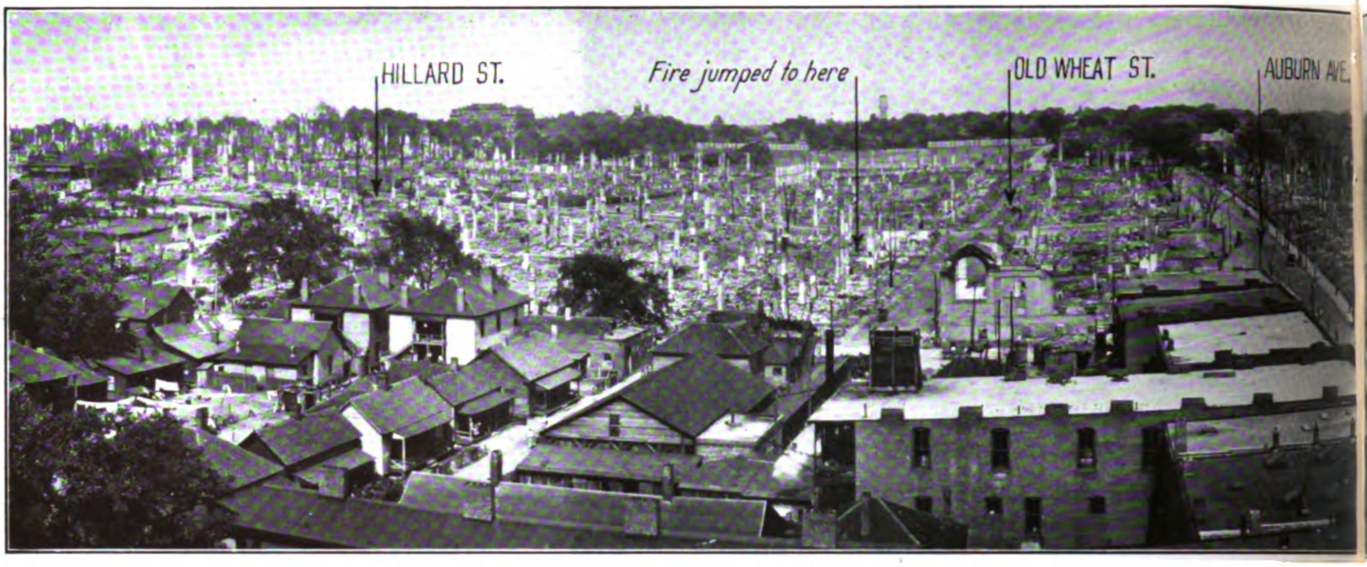
### Extent of the Conflagration

"The fire devastated a total area of about 300 acres. The total number of buildings involved was 1,938, of which 47 were brick and 1,891 frame. Classified by occupancy there were 1,537 dwellings and apartments, 42 mercantiles, 351 garages and outhouses and 8 miscellaneous occupancies, including churches, schools, special hazards and warehouses. Of the total number of buildings 1,682, about 80 per cent, had shingle roofs.

"It is estimated that the total property loss was about $5,500,000, of which about $3,500,000 was covered by insurance. Extensive damage was done to the trolley wires, feeders and poles of the street railway system, amounting to approximately $125,000, and probably a like loss was suffered by the telephone company. The direct expense of the city was heavy; approximately $20,000 worth of hose was destroyed, and the cost of bringing outside aid will be considerable.

Group view of the tinder boxes in which human beings were permitted to live

"About 10,000 people were made homeless, and many, particularly the negroes, lost everything they owned. The majority of the homeless were being housed with other people in the city, which, although not classed as a direct loss, must be considered as an economic burden, due to the fire.



Panorama view of the burned area. Had a high wind been blowing the wooden houses in the fore

### Beginning of the Serious Fire

"A telephone alarm was received for a fire on the roof of a one-story, small frame shanty, used by the city for storage, and adjacent to another one and just east of Skinner's warehouse, near the corner of Fort and Decatur streets. This location is northeast of the Woodward avenue fire and across the railroad about 2,500 'feet. Although the U. S. Weather Bureau records, taken on the top of the Empire Building, show a wind blowing due north from 11.00 A. M. throughout the day, the general path of the resulting conflagration is slightly northeast and almost in alignment with the Woodward avenue fire. It is probable that near the ground level, because of topographical conditions and the proximity of the high buildings of the congested value district to the west, the wind was sufficiently deflected to carry embers in this direction.

"Ladder Company 11 and the steamer of Engine Company 11 were the only companies in quarters on receipt of the alarm for this fire. The men of the Ladder Company report that, upon arrival, all the fire was on the exterior of the roof, but it had reached too great a magnitude to extinguish with the chemical in the 60-gallon tank carried. As no hose wagon responded with the engine it could not be used for about 15 minutes, during which time the fire had spread to the adjacent buildings. The men on Truck 12, which in transferring had to pass through Decatur street, also saw this fire before Truck 11 had arrived and tried to report it by telephone to headquarters, but could not get a connection. Truck 12 was met by a chief's driver from headquarters and taken to Station 8, where several lengths of hose were thrown over the frame, after which it responded to the fire, arriving there in about 15 minutes after the fire started. This truck, which was horse-drawn, traveled about five miles in covering the entire distance.

"Box 46 was pulled at 12.46 and help was also asked for by telephone. The fire alarm operator, realizing the seriousness of conditions, got in touch wth the fire departments of Decatur, East Point and Marietta and requested assistance; all of these departments responded.

"Soon after 1.00 P. M., about 15 minutes after this fire started, apparatus from the other fires began to arrive. Pumping Engine No. 2, on arrival at Woodward avenue, was sent direct to the Decatur street fire and reports getting into service at Pittman alley and Hilliard street between 1 and 1.30.

"The Decatur pumping engine arrived about 1.40 and was placed at Yonge and Chamberlain streets.

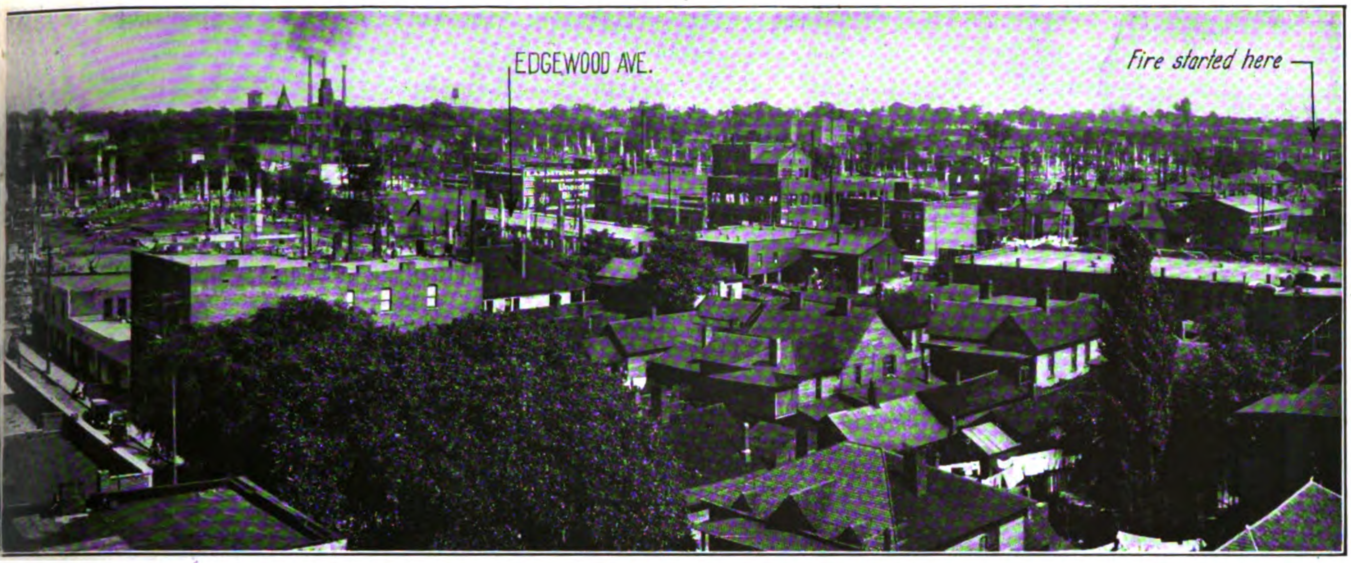
### Conditions During the Conflagration

"The spread of the fire locally was very rapid, because of the close grouping of the small frame buildings and the condition of the roofs, as can be seen from views shown in Plates 1, 2, 3 and 12. This fire was eventually controlled and did not pass Edgewood avenue by direct contact; a considerable part of the block south of Edgewood avenue, consisting of mainly brick buildings and including the sprinklered Trio Laundry, was not burned. This is shown in the panoram picture reproduced in Plate 7.

"However, long before the fire had spread to Edgewood avenue, flying embers had spread the conflagration blocks ahead of the actual burning buildings.

"These embers lighting on the dry roofs quickly ignited the tinder-like shingles, with the result that a series of conflagrations was in progress, extending over the area and from a quarter to a half mile ahead of the fire department.

"Persons viewing the fire from the high buildings to the west of the burned area report as many as seven distinct fires in progress at the same time.



ground would have made an easy path for the fire to travel to the business section of the city

"Several companies, particularly those reporting from the other fires, were rushed ahead to cut off the conflagration. It had assumed serious conditions by 2.30 as far north as Houston street and was extending by leaps and bounds well north. The Newman Engine Company reports that on arrival it responded and reached North avenue and Jackson street at 4.30, at which place an extensive fire was in progress; this is 1½ miles from Decatur street, where the fire started. Within an hour this company was forced back to Hunt street, at which point it stayed until 11.00 P. M.

"Between 2 and 3 o'clock a stand was made at Highland avenue and Boulevard and a group of buildings, some of which were brick and four of which had fire-resistive roofs, were saved on the northwest corner. The engines operating at this point were driven north and east, but succeeded in preventing the spread to a considerable extent. Some engines worked east to Boulevard and north of Highland avenue up to 10.00 P. M.

"North of Morgan street the houses are more scattered and just north of North avenue is a considerable vacant area; this helped to contract the actual path of the flame on the east.

"Operations on the west side of the fire were mainly with hose streams; various apparatus bringing spare hose permitted operation all along Fort street, and as buildings on both sides of this street were low and evidently the wind was carrying the embers away from this street, it was possible to keep the fire from crossing except in a few isolated cases, which were extinguished before much more than the roof had become involved. Except where there was a severe direct exposure the buildings just east of Fort street and north of Irwin street were saved. This indicates that the actual spread of the conflagration was not due to a wave of heat, as is usual in such a conflagration.

"The appearance of many of the trees in the burned area also clearly indicates that a true conflagration condition did not exist; the rapid spread by embers on shingle roofs, with the fire jumping blocks ahead, in part accounts for this. Evidence is clear that in many cases the actual burning of the houses was against the wind, adjacent buildings being ignited to the south of one of which the roof had previously caught fire. This resulted in a series of local conflagrations, which burned themselves out on reaching an area already consumed.

"A typical example of the absence of a conflagration wave is shown in the buildings saved at Highland avenue and Boulevard, and again at Ponce de Leon avenue and Jackson street; at this last location four dwellings of brick veneer and with fire-resistive roofs were not ignited, although evidently in the path of any heat wave which might have existed. Also the buildings and trees north of Ponce de Leon avenue were heat injured to only a slight extent, but several houses were damaged by the shingle roofs igniting from sparks. Several other instances of buildings partially or directly in the path of the fire, but not directly or seriously exposed, indicate the value of fire-resistive roof coverings.

### Sprinklered Buildings

"Only one sprinklered building was directly exposed in the conflagration. This was the Trio Laundry, located on Tanner street, between Fort and Grant streets. This and adjoining boiler room and stable were of brick construction, one-story in height and with unprotected windows. Area of main building, 10,434 square feet. Sprinkler protection, covering the entire building, consisted of a dry-pipe system, with only supply from the 6-inch municipal main, giving 50 to 55 pounds static on the highest line of sprinklers. An inspector of the sprinklered risk department of the

South-Eastern Underwriters' Association reached the building when the fire was about two blocks distant. The inspector tripped the valve and closed all windows and the monitor. He reports that four heads were open before the windows went out. A total of 79 heads were opened and did excellent service in preventing the spread of the fire in the building, the heads on the first line forming a water curtain.

View of the Conflagration as It Gained Full Headway

"The fire department had concentrated several companies in and about this neighborhood and officers report playing lines on the window casings at various times. The sprinklers undoubtedly were an aid to the department in preventing the direct travel of the fire at this point to beyond Edgewood avenue, and practically all the buildings in this block were either uninjured or only partially destroyed. The exposure was not excessive, being from small frame buildings 45 feet distant.

#### Conclusions

"It is important to learn the lessons of a conflagration; it is still more important to apply them. Most American cities, towns and villages are in danger of conflagration and conditions in many of them are worse than those of Atlanta. A great disaster serves to focus attention, but fires which virtually wipe out small communities are so frequent as to pass unnoticed.

"Many of the lessons taught by the Atlanta disaster are similar to those of Chelsea, Salem, Jacksonville, Augusta, Nashville and Paris—to mention only a few. They will be repeated in many other places unless these lessons are effective in changing conditions.

#### Effect of Wooden Shingle Roofs

"This conflagration, together with two of the other fires occurring at the same time, emphasizes the ease with which spreading fires may develop in cities where wooden shingle roofs predominate, even when the fire department is mainly well equipped and manned. It illustrates the startling suddenness with which such a fire may grow into a conflagration under favorable conditions.

"For a period of eight hours the remaining part of the city, including the business district, was practically without protection. A shift of the wind during the progress of the fire would have resulted in a corresponding change in the path of devastation, and might have involved the business district, where the high values of the city exist; for it would have been impossible to stop the spread through the shingle-roof area, which even now extends to the edge of that district.

#### Operations of the Fire Department

"Apparently the operation of the fire department was all that could have been expected under the circumstances, and the chief should be commended for using every available facility, as well as for making strong efforts to restrict the spread of the flames at such advantageous points as Edgewood avenue, Irwin street, Highland avenue and Ponce de Leon avenue, and for immediately taking steps to secure from local sources additional hose, nozzles and hydrant wrenches, and to summon aid from nearby cities. But all of these efforts were of little avail because of the prevalence of shingle roofs, which permitted flying brands to start local fires blocks beyond the actual fire and far ahead of the location of the fire apparatus."

*The menace of the wood shingle roof should no longer be tolerated.*

# The Fire Waste of America Can Be Stopped

*Buildings constitute the most important factor of National wealth. Fire waste and rapid depreciation are daily making terrible inroads on this Commonwealth of the people. The direct and indirect loss involved is greater than all taxation.*

*Money saved by preventing fires will be distributed among communities—by lesser taxation; among manufacturers—by increased sales of fire-resisting building materials and protective devices; among people at large—by lower rentals and cost of living; among individual building owners—by lower insurance premiums and less cost of upkeep, and among fire insurance companies—by fewer losses.*

*The United States Government and State and Municipal Building Officials representing the people, together with the insurance interests and the manufacturers of materials and devices which enter into the construction of better and safer types of buildings, can and must work together for National welfare and mutual profit.*

*These articles outline what has been done and what can be done by various interested organizations and representatives of the people to standardize and nationalize better and safer building construction. It is the duty of every property-owner, building official, architect and builder, each for his own particular interest, to give careful consideration to this subject.*

*No Federal, State or City official—no fire insurance man—no manufacturer—no Chamber of Commerce member—and no building owner, can afford to miss reading these articles!*

## A National Building Policy Should Be Adopted

AT this time, in the dawning of the most epochal age of history, when world forces are being moulded and directed in the interests of the people of the greater and lesser nations of the earth, there must come a tremendous reaction in the form of national introspection, national self-criticism and a desire for betterment of the conditions of existence in every civilized country.

The results of this introspection, on the part of the people of America, must be a realization of unnecessary waste and a truer belief of the value of conservation of natural wealth as it exists in the form of food products and buildings.

One of the greatest wastes permitted by the American people is that which results directly and indirectly from the destruction of buildings and building contents by fire. Great conflagrations ravage our cities and burn into the minds of the people the lesson which seems never to be learned. Each year one hundred thousand homes are destroyed by fire and every issue of every newspaper in America records the destruction of lives and property following in the wake of flame and smoke in factory or workshop, dock or steamship, home, hotel or office building. From time to time we read of children murdered by inefficient building codes and inspection, which allow the existence of fire-trap schools; of terrible disasters in the burning of theaters and other places of public assembly. The black trail of destruction by fire runs from coast to coast unchecked, with a tale of human suffering and loss, which, if attributed to any other known cause, would result in a wave of popular indignation and activity in the cause of prevention. *The people have been accustomed to endure fires.*

What, then, are we doing and what can we do in the matter?

This is the story of the forces which have been set in action to lessen the fire hazards of the nation; of their accomplishments and possibilities; of duplicated effort and the need for the co-ordination of individual activities of high efficiency—a story of the tremendous possibilities of a National Building Policy in fighting for the reduction of the fire waste. The story is written and presented in a spirit of helpful criticism and is born of the desire to weld together all efforts toward this common end, which are now being directed along independent lines.

Why should dangerous conditions be allowed to exist, that a few may profit while many suffer? Why should the requirements of building codes vary as they do? Why should it be true that the great industry of building construction, based, as it is, upon the science and art of engineering and architecture, be, nevertheless, an unstable and unstandardized industry, a ship without a rudder of standardization in a sea of varying and contradictory building codes, insurance and legal requirements?

# *Need for Reform is Imperative*

THE nearer to incombustibility of buildings and contents we come in this country, the nearer do we approach the solution of the fire waste problem. What do we find to be the condition in America at the present time?

Of all buildings erected we find less than one per cent of the fireproof type and over 99 per cent of buildings so constructed that they will more or less readily burn.

This answer points the way to what our National Building Policy should be—more fire-resistive buildings.

As a nation we have, as before stated, been *accustomed to endure fire loss.* We have tackled the question of fire loss backwards. We have developed to a high degree of perfection our fire-fighting forces and have made the high standard of these forces, the bravery of the firemen and the perfection of the mechanical equipment, our chief—frequently our only—reliance in avoiding loss. In other words, we have been putting fires out rather than preventing them.

We next turn our national attention to the question of Fire Prevention. This is a comparatively recent movement and comprises many wise and excellent ways and means. Among such means may be mentioned the Fire Prevention Bureaus of such cities as Chicago and New York, which seek out and call for the correction of fire-dangerous structural conditions, including inadequate exits and fire escapes. They also endeavor to prevent the accumulation of combustible rubbish—fire breeders—in cellars and attics. The fire insurance companies do their part in granting rate concessions for buildings of fire-resistive character and for the protection of their contents by automatic sprinklers and by standpipes and other manually operated protective devices. They also encourage by rate reductions the best possible water pressure and supply conditions in cities, towns and villages. Many other efforts in different directions, generally unrelated, are in progress by agencies and individuals.

All such efforts are excellent and should be encouraged. Their value should be fully recognized and supported, because of the vast number of burnable buildings which exist and will continue to exist for years and decades to come. But even in the case of the greater number of existing burnable buildings these may be made, and it should be a part of our National Building Policy to so make them far less hazardous than they are to-day.

The whole question of prevention of fire, in its final analysis, becomes one of rendering the buildings unburnable and of protecting the contents from destroying lives and property contents and the buildings which house them.

### Hazards—External and Internal

There are two broad phases of the danger of fire to buildings, viz.:

The external hazard causing conflagrations;

The internal fire hazard in individual buildings.

Let us consider these two phases in the order above named.

The external hazard is due to the combustibility of the exterior surfaces of the buildings. When such structures are grouped together in large numbers in congested areas, then the hazard becomes one of conflagration. In congested areas the use of readily combustible wood shingles for finished roofings should by all means be prohibited. There should be no compromise on this question. Even in scattered communities it is unwise to use combustible wood shingles on roofs, because of the danger from sparks from chimneys setting the roof on fire and the general lack of public fire protection in such places. Usually the building is burned to the ground.

Almost as hazardous as the wood shingle and certainly a serious factor in furthering a conflagration is the wood siding—the exterior surfaces of the exterior walls, whether of siding, clapboard or shingles.

With the exteriors of roofs and walls made incombustible our national external fire hazard, which furnishes a considerable part of our fire loss, would be practically eliminated. It is quite logical, therefore, that our National Building Policy should include measures to prevent or seriously discourage the use of the combustible wood shingle roofing and the combustible exterior siding.

The interior fire in individual buildings is invariably of very small beginnings. It grows larger by finding fuel to feed upon. If such fuel were out of reach, or if something incombustible lay between the incipient fire and the fuel, then the fire would die out and no great danger would develop.

We erect some buildings well, but the majority very badly. Even in the well-built structures we place highly combustible materials and precious lives therein. Both of these should be protected as well as possible with automatic sprinklers, automatic fire detectors and extinguishers always ready and always at hand. We should freely use the principle of fire wall and other cut-offs in horizontal and vertical directions. We should provide adequate exits for persons, so that they can go into places of safety both in a horizontal and vertical direction.

These measures of safety in well-constructed buildings are fairly well understood and their use is not considered a hardship by owners and occupants of such buildings.

Our National Building Policy should, however, make such safeguards compulsory.

It is in the greater number of existing poorly designed and constructed buildings that the problem of the interior fire hazard becomes complicated and complex. Control of the situation in future buildings to be erected can be secured by the establishment of standards giving the manner of construction. The establishment of such standards of construction in each "class" of buildings should be a part of our National Building Policy.

### Changing Existing Structures

Existing buildings can be improved so that the interior fire hazard will be greatly lessened, if not practically eliminated, more easily than is generally imagined. What is more, the buildings are then increased in value to a greater amount than the money expended in effecting such improvements. From an economical standpoint the property is improved and, therefore, there can be no excuse for an owner not effecting the betterment.

Upkeep, obsolescence, heating cost and insurance are all lessened and the capital and renting values increased.

Sources of constant danger are the basement and attic. In joisted buildings the lower tier of joists is frequently exposed. This should be lathed with incombustible lath and plastered, or otherwise covered with suitable incombustible surfacing, forming the ceiling of the basement or cellar. The roof framing in attics of all buildings should be similarly treated.

Where walls and partitions are of wood studding, proper cut-offs should be provided on each horizontal plane, so that fire could not travel between walls and partitions through flue action. Flues, conduits, fire places and hot-air pipes should be properly safeguarded.

Our National Building Policy should take cognizance of all such existing buildings and advocate such legislative and insurance rate encouragements as would bring about such improvements in the mass.

The insurance rate question has an economic influence on the use of structural materials with which we are compelled to reckon.

This influence can be exercised wisely or unwisely, it can encourage or discourage the use of known or little known materials, types of construction or protective devices.

In the main, this influence has been exerted wisely, but there is always an inertia to be overcome—an indisposition to depart from the use of known and accepted methods or materials on the part of rating authorities, which tends to postpone the use of improved practices, materials and devices.

The very fact that this inertia and indisposition to cut red tape does exist among the fire-rating authorities, and that this does delay and prevent improvements in construction methods, indicates the necessity for more elasticity in procedure and for a harmonizing of the rating schedules all along the line and with the policies of Federal, State and city building regulations.

It should, therefore, be a part of the National Building Policy that the fire insurance rating schedules should be in accord and in harmony with all other factors of the National Building Policy.

### Local Building Codes

Again, to inertia and to inelastic building codes, which quickly become out of date, must be ascribed the difficulties encountered when it is sought to introduce into use, in almost all cities, any material or type of construction which is new or happens not specifically to be named in such inelastic building codes, by accident or design.

Sometimes wise discretion is granted to the administrative officials, which is wisely used in cutting red tape. Engineering test or history of use data is accepted as a guide by the officials, and the desirable material or type of construction is permitted to be used in that city to the benefit of the builder, owner and citizens alike.

More often the hands of officials are tied or they may not care to assume the responsibility of passing judgment upon something unknown to them, and the use of such desirable material or type of construction is thereby denied in their city. And this may, and does in the majority of cities, go on year after year until perhaps a new code is drafted, or perhaps it continues for more years to come.

This postponement of and hindrances offered to the use of improvements in construction by the inertia of both insurance rating authorities and cities affects the fire waste definitely and materially. Can we wonder any more that our direct national fire loss is $2.50 against the European 30 cents per capita?

A growing number of cities and states, in the more recent building codes adopted, permit the use of new, or not specifically named materials or types of construction when such are able to satisfactorily comply with some specification of test, such as the standard test for structural floors or the one for "fireproof" partitions of the American Society for Testing Materials. Some city officials will accept properly authenticated evidence of satisfactory compliance with the specified test and admit the material or construction to use in that city.

More often, however, a city official under such a requirement *will refuse to accept such evidence* and place the outrageous requirement on the applicant that a test *must be conducted under his nose in his city*. Such tests cost money, frequently hundreds of dollars, and there are very few laboratories and institutions in this country equipped to conduct them. And so the official's dictum becomes, in effect, an absolute prohibition, as in the vast majority of cases *there is no laboratory for conducting such tests in that city*.

All of these hindrances to advancement operate to the detriment of the cities themselves and the country as a whole. The whole plan is archaic and lacking in good sense. It goes without saying that the system must be changed for the public good.

How it may be changed is a question more easily and satisfactorily answered than would at first appear, as will be explained in the next article dealing with this question.

We believe that we have pointed out a sufficient number of matters in which improvement should be effected to amply support our statement that there is need of a National Building Policy.

## *Steady Trend Toward a National Policy*

FEW persons realize that a National Building Policy has been slowly developing in past years and has now reached a stage which permits of its presentation to the whole country for adoption. It is our purpose to outline and explain the development that has been taking place, so that a correlation of all efforts may be brought about for the public good.

Many persons have been working for years for an amelioration of the faulty conditions which contribute to and permit the fire waste.

In England, Edwin O. Sachs, as chairman of the Executive, and the directing influence, of the British Fire Prevention Committee, has made that institution a power for good and effective service. It has produced by fire tests a mass of information regarding the fire-resistive values of materials and types of construction. Its report on the Baltimore conflagration is conceded to be the most thorough and impartial account of this disaster that has been published.

### Men of Broad Vision

Our own country has produced men, most of whom are happily contemporary, who have contributed largely and have devoted high intellectual attainments and time to the cause. The names of the late Edward Atkinson, of Boston, Col. Theodore Roosevelt, our ex-President, Powell Evans of Philadelphia, Prof. Ira H. Woolson of New York, Dr. S. W. Stratton of the United States Bureau of Standards, Rudolph P. Miller of New York and Franklin H. Wentworth of Boston, deserve special mention, not only because of their distinguished services to the cause and to the country, but because of the connections they hold or have held with the National Government and institutions of importance and the far-reaching influence of their work.

The late Edward Atkinson was identified with the New England Factory Mutual Fire Insurance companies. He established a laboratory in Boston for conducting fire tests on, and for ascertaining physical values of, structural materials. Great progress has been made since his time, but it is generally recognized that his work blazed the way for others to follow.

Unquestionably, the foremost advocate of conservation in this country is Col. Theodore Roosevelt. During his second term as President, Mr. Roosevelt, appreciating the danger threatening the nation through the draining of its natural and its constructive wealth, called a convention of scientific men and captains of industry at Washington and outlined a definite programme for the careful husbanding of the people's wealth. Not the least forceful of the speakers upon that important occasion were the representatives of the great fire insurance companies. These made clear to the assembly that it was little more than useless to create wealth in the form of buildings if these were to be permitted to burn in anything like the ratio that they had up to that time. The force of this statement was appreciated by the President and by members of the assembly, and emphatic approval was given to the general idea put forward by the underwriters. To Colonel Roosevelt must be ascribed the great credit for proclaiming the slogan of conservation which has since become the watchword of the nation.

Powell Evans is a man of broad enthusiasm, knowledge and usefulness. He is chairman of the Fire Prevention Committee of the Chamber of Commerce of the United States of America, and also of the Fire Prevention Commission of his own city of Philadelphia. His work in bringing about the first National Fire Prevention Convention held in Philadelphia, in October, 1913, was a national service of note and is referred to at length elsewhere in this article.

Professor Woolson, when in charge of the Mechanical Engineering Laboratory at Columbia University, conducted so many fire and other physical tests on structural materials that he became a national, indeed, an international, authority on the subject. As consulting engineer to the Committee on Building Construction of the National Board of Fire Underwriters he wields a great and beneficial influence. He is the author of the Model Code, issued by the National Board, which serves as an inspiration for the writers of many city building codes. Professor Woolson's active participation in the fight against fire waste includes the chairmanship of the Committee on Fire-Resistive Construction of the National Fire Protection Association and of Committee C-5 on Fireproofing of the American Society for Testing Materials. He also served as chairman of the conferences between representatives of the scientific societies, fire underwriters and United States Government, which considered the classification of materials and standardization of methods for conducting fire tests. . To each of these activities more extended reference is made later in this article.

Dr. S. W. Stratton will always be remembered as the director of the United States Bureau of Standards, which, under his guidance, has in recent years attained a great national usefulness. He initiated the plan of the investigation of different structural materials and methods of construction and related subjects under the guidance of advisory committees. The memberships of these advisory committees were drawn from the persons most qualified in the country to deal with the particular investigations and from the ranks of manufacturers, architects, engineers, fire underwriters, Government departments and the Bureau of Standards. He also advanced and acted upon the plan of collecting extant information and of closely co-operating with scientific bodies and fire underwriters.

Rudolph P. Miller is best known by virtue of his great and useful work for the city of New York. As engineer of the Bureau of Buildings he was associated with Professor Woolson while at Columbia in much of the fire tests and investigations conducted in the interest of the city of New York. Later as superintendent of buildings, his administration of the building laws was broadgauged, impartial and commanded universal respect and confidence. This marked him as the logical man to undertake the rewriting of the building code for the city of New York, after the failure of the many abortive efforts of politicians. In this great work he achieved a marked success in producing a code of building laws advantageous both to the community and the owners of buildings, and which is universally recognized as fair and just to all. He at present serves the city as chairman, both of the Board of Appeals and the Board of Standards, and in this capacity exercises an impartial and well-matured judgment in the multitude of problems arising regarding the interpretation of the various building laws affecting the city—now largely correlated—and on the proper use of structural materials. He is properly regarded as the highest building code authority in the greatest city in the world.

Franklin H. Wentworth is secretary of the National Fire Protection Association. Not only has he so conducted the affairs of this organization that it has become a power for good in the land, but he has gone out into the highways and byways and preached the gospel of fire prevention. He is a fluent and able speaker and inspires many in his audiences to become workers in the cause. His logic is perfect, which, together with the array of facts and figures which he can always present, invariably carries conviction.

We have considered some of the intellectual influences which have been at work. Now let us pass to what has taken place in the actual development of a National Building Policy.

### Steps in the March of Progress

Six steps stand out prominently as milestones marking the progress made, viz.:

1903—The International Fire Prevention Congress in London, England, was held.

1907—President Theodore Roosevelt called together the first national meeting on Conservation of Natural and Created Resources.

1913—The first National Fire Prevention Convention was held in Philadelphia under the guidance of Powell Evans.

1914—The report of its Committee on Fire-Resistive Construction was adopted by the National Fire Protection Association. This accepted the principle of classification of structural materials in accordance with their fire-resistive values.

1916—The report of the same committee adopted by the National Fire Protection Association laid down the principle of the grading of completed buildings in accordance with their fire-resistive values. Also the first meeting of the conference committee on Fire Tests of Wall Constructions was held at United States Bureau of Standards in Washington, D. C.

1917—The conference of representatives from the United States Bureau of Standards, fire underwriters, the N. F. P. A. and the A. S. T. M., and the principal technical and scientific societies of this country and Canada, was held on the questions of classification of structural materials and the standardization of fire-test methods.

It will be seen that in all of these steps there has been no conflict, but each step has led up to the development of an uniform policy. It will be also noticed that most of the development has taken place in the recent years, thus emphasizing our statement that the time has now arrived when a National Building Policy can be stated in definite terms.

Having outlined the historic happenings in the development of fire protection since 1903, it will be of pronounced interest to recite in some detail these events and their relation to existing conditions.

In the year 1903 the British Fire Prevention Committee called together an International Fire Prevention Congress.

The congress was attended by representatives from all civilized countries and met in London, England. It agreed upon the following principles and policies:

(1) That there were degrees in fire resistance of materials of construction and that there was nothing strictly and absolutely fireproof.

(2) To abandon the use of the word "fireproof" and substitute therefor the term "fire-resistive" or "fire-resisting."

(3) To graduate or classify the fire-resistive values of building materials or types of construction by dividing values into three broad classes, to which the congress gave the names of "Full Protection," "Partial Protection" and "Temporary Protection," respectively.

(4) The congress outlined the resistance desired in these three classes in terms of deg. F. and time of exposure, stating these in tables giving a series of fire-test specifications.

The action of the International Fire Prevention Congress was an important step forward. It laid down the principles and a practical method for securing classification and standardization of structural materials and types of construction.

In this country ever since the action of the congress in London, individuals have been explaining and advocating these principles, with the purpose of securing their general adoption.

### National Fire Prevention Convention

In October, 1913, Powell Evans of Philadelphia, called together in that city a national fire prevention convention. Mr. Evans, with great public spirit, defrayed a large part of the cost of this gathering out of his own purse. He secured the co-operation of persons of authority as speakers on the many divisions of the subject of fire waste. He laid out the programme and directed the proceedings of the convention as its chairman. The meeting was largely attended by those interested and specially qualified in this important subject. It was a distinct success.

Mr. Evans, in the preface of the official record of the convention, laid down the dictum that fire waste caused the useless loss of (1) life; (2) health; (3) employment; (4) creative property; (5) business good will; (6) national resources, and (7) undue effort and expense to extinguish fires and insure against fires.

The proceedings of the convention took the form of topics; each being presented, first of all, by one or more speakers, and then discussed by the convention, followed by the adoption of a resolution on each topic.

The topics and the resolutions adopted were as follows:

#### Topic 1—"Location" (Exposure Hazard)

"Fire is always local, originating from a definite cause in a definite property on a definite location; hence every building—in reasonable relation to its size, character, use and the congestion of its location—should be so constructed as to prevent the passage of fire from within to without and vice-versa."

#### Topic 2—"Zones of Danger"

"Populous communities should be divided into danger zones; wherein rules reasonably limiting, defining and regulating the presence, form and use of property may be legally imposed, with due regard for the present and near prospective congestion of life and property in such areas."

#### Topic 3—"Building Construction"

"All building construction and reconstruction—having in view the present and near prospective congestion of its location and the range of occupancy proposed—should fully include in design, specification, construction and appliances, adequate safeguards against danger to life and property. All buildings should be required by law to be fitted with adequate fire exits and escapes proportioned to their human occupancy in accord with reasonable exit tests. Outside fire escapes are deemed the least desirable of all forms."

#### Topic 4—"Building Codes"

"(a) All building construction and reconstruction should be under Government control, State or local, to the end that the greatest safety for the greatest number for the present and future should be assured;

"(b) Each of the several States should adopt a State building code, with requirements which local governing bodies may raise but not lower by local enactment, said requirements to be enforced by proper governmental machinery over all of each and every State;

"(c) The classification of building construction is entirely one of relative ability to resist attacks by fire, and therefore in all building codes the term of 'fireproof' should be replaced by 'fire-resistant,' and ordinary frame construction should be classed as 'combustible'; and

"(d) The National Fire Protection Association is hereby requested to recommend approved standards of fire-resistant construction which may be used by States and municipalities in their respective building codes."

NOTE: Section (d) was subsequently modified in its force and intent by resolution adopted under Topic 8, "Compulsory Physical Standards," whereby the recommendations of the National Fire Protection Association and other originators of standards are to refer same for approval to the Bureau of Standards of the Department of Commerce of the National Government at Washington.—EDITOR.

### Topic 5—"Protection (Private)"

"(a) Every building—for its own safety and that of its contents in life and property—should be fitted reasonably, with respect to its location, character and use, with proper mechanical aids to discover, alarm and extinguish fire and to resist lightning; and

"(b) The occupants of every building should be reasonably educated regarding the physical structure thereof, and how to leave same in a quick and orderly manner, and be organized reasonably to fight fire therein."

### Topic 6—"Protection (Public)"

"(a) All communities need physically a sure water supply, broadly usable by citizens for private fire protection, under the least onerous terms—also adequate modern fire-fighting apparatus with proper personnel to operate same; also an adequate alarm system—all proportionate to the character, area and population of each community; and

"(b) All fire-fighting forces should be efficiently organized in enduring form, under legal control and discipline when possible; their morale and requirements should be high and solely influenced by good of the service considerations; and the training should be constant and adequate for efficient fire-fighting and fire-prevention inspection and the purchase and maintenance of valuable special mechanical apparatus."

### Topic 7—"Equipment"

"All equipment for buildings should be adequately designed and constructed with respect to its fire hazard—productive or receptive—and that its use should be predicated on reasonable compliance with such requirements, and should be reasonably regulated everywhere by laws."

### Topic 8—"Compulsory Physical Standards"

"In view of the growth of State laws and municipal ordinances to prevent the appalling loss of life, due to fire, and to control fire waste by the widespread legal imposition of physical requirements upon the construction, protection and equipment of buildings, it is now important that:

"(a) Physical standards on this entire subject be formulated which may be generally and legally imposed without undue hardship or cost upon the public; and

"(b) That the Federal Government through its Bureau of Standards of the Department of Commerce should arrange to review such standards for approval and promulgation in uniform language, to the end that they may be used by States and municipalities in laws and ordinances; and Therefore Be It Further Resolved:

"(c) That the National Fire Protection Association be requested through its Executive Committee to arrange for a conference of delegates, with the chairman of this convention as chairman, from the American Society for Testing Materials, the American Society of Mechanical Engineers, the American Society of Civil Engineers, the American Institute of Electrical Engineers, and all kindred national societies having standards bearing on this subject, for the purpose of collecting such standards for submission to the Federal Government; and Be It Further Resolved:

"(d) That the conference thus formed be requested to take the necessary steps to bring these resolutions before Congress and to secure the required legislation at the earliest opportunity."

### Topics 9 and 10—"Occupancy" and "Annual Occupancy and License"

"(a) The individual occupancy hazard (the relative fire hazard to life and property in any given building inherent in any given pursuit) should be definitely controlled as to construction by the building code; and as to management by proper police (or equivalent) continuous regulation to assure reasonable safety of life and property therein;

"(b) The general occupancy hazard (the relative community hazard inherent in any given pursuit) should be definitely controlled in every populous community by law, which should exclude extra-hazardous pursuits, and properly place and safeguard by appropriate legal rules permissable hazardous pursuits in their danger zone (or other like delimited area); and

"(c) The control of occupancy conditions, through requirements imposed by law, is essential for the abatement of fire waste of life and property; and this control to be actual and effective should cover all property (at least in cities) and continuously—at least once annually—and upon every substantial change of tenancy, through the agency of an occupancy license based upon competent legal inspection by the fire-fighting force or an adequate similar agency."

### Topic 11—"Management"

"Based on evidence and opinions obtainable approximately one-half of all fire waste—including avoidable fires without fraud as well as arson fires—arises from ignorant, shiftless, dirty and vicious use of property (which condition causes an approximate-like proportion of sickness and immorality in all populous centers), and therefore minimum continuing requirements as to clean and orderly living and the suppression of dangerous fire-breeding nuisances (such as the snap match, dangerous smoking, careless storage of rubbish, ashes, etc.) should be imposed by law in all communities, through the agency of the police power, acting through State and municipal fire marshals (or like officials), using the active fire-fighting organization for inspections as much as possible and all volunteer aid procurable."

### Topic 12—"Legislation"

"While fire loss of life and property is always local in inception, its result is national in effect, and hence its control must be effected by the operation of a sum total of State and municipal laws which will suppress the range of fire hazards to an attainable minimum everywhere and all the time; and that by this course alone can the sum total of fire waste of life and property be speedily and substantially reduced, and the cost of fire insurance (which reflects this total loss) be lessened throughout the country."

### Topic 13—"Education"

"Education of the public about fire danger and waste of life and property should be provided in all laws, ordinances and regulations on the subject; and all interests concerned should not only join issue in collecting accurate and authoritative data, but make equal effort to disseminate this information regularly and continuously among all the people in readily understandable language, to the end that they may not only accept but demand proper fire waste regulation and live in full accord therewith."

### Topic 14—"Insurance"

"(a) The several States, Territories and Provinces should not only assure that permissible fire insurance is stable financially, but that the form of contract should be as clear, brief, explicit and sound as possible and, as nearly as may be, uniform in substance in all these jurisdictions, to the end that all such policies permitted to issue throughout the country may equally and adequately protect all citizens, including the ignorant and inexperienced; and

"(b) Said jurisdictions should as nearly as possible adopt uniform regulations governing:

(1) Issuance of fire policies on property.

(2) Licensing of fire insurance agents and brokers, and

(3) Licensing of fire insurance adjusters, to the end that only reasonable insurance contracts will be permitted on property, and that only men of sound character will be admitted to the business of writing fire insurance and adjusting fire losses, thus discouraging arson and complicity with fraudulent losses."

### Topic 15—"Organization"

#### Discussion, but No Resolution

It will be noted that the resolutions above quoted on the topics "Building Codes" and "Compulsory Physical Standards" both laid down the principle of the classification of building construction, that is, the materials and the completed buildings, in accordance with their relative ability to resist fire. The resolutions also urged the discontinuance of the word "fireproof" and the use of the term "fire-resistant," and that the use of physical standards should be compulsory.

The resolution on "Building Codes" also recommended that ordinary frame construction should be classed and named "combustible," serving as a warning to all that such a building will quickly burn.

In the discussion on "Compulsory Physical Standards," reference was made to the action of the International Fire Prevention Congress, and the resolutions adopted by that congress in 1903 were read and appear verbatim in the official record of the convention.

Here then was one important step, in that the convention, representing, as it did, persons of influence, authority and expert acquaintance with the subject from all parts of the country, recognized the correctness of the principle of classification of materials and completed buildings in accordance with their fire-resistive value.

The Committee on Fire Resistive Construction of the National Fire Protection Association made a report at the meeting of that association held in 1914. This report advocated the principle of classification of materials. It was adopted by the organization, and so the association, which is largely identified with the fire insurance interests, became definitely committed to this principle.

### Classification of Buildings

But the National Fire Protection Association went one step further. It was found in the work of its Committee on Fire-Resistive Construction, following the adoption of the report of 1914, that it was advisable to grade completed buildings in accordance with their relative fire resistiveness.

Therefore, in the report of the committee to the annual meeting of the association in 1916, it was recommended that completed buildings be divided into three grades—namely, A, B and C—denoting their relative fire resistiveness in each "class" of buildings. This report was adopted by the National Fire Protection Association, and so now we have that influential and highly useful organization committed to and advocating both the classification of *materials* and the grading of *completed buildings* in accordance with their ability to resist destruction by fire.

From this time on the development has been rapid. The logical next step for the Committee of the N. F. P. to take was manifestly to develop fire-test specifications. But the American Society for Testing Materials exercises this function through its technical Committee "C-5" on Fireproofing.

The suggestion was made, therefore, that the committees of these two bodies should co-operate in the work of formulating fire-test specifications.

### Important Co-operation Secured

This co-operation was effected, and after one meeting was expanded to include authorized representatives from each of the following institutions under the chairmanship of Prof. Ira H. Woolson:

American Society for Testing Materials;
National Fire Protection Association;
United States Bureau of Standards;
National Board of Fire Underwriters;
Underwriters' Laboratories, Inc.;
Associated Factory Mutual Fire Insurance Companies;
American Society of Mechanical Engineers;
American Society of Civil Engineers;
Canadian Society of Civil Engineers;
American Concrete Institute.

The representatives attending this conference form a group of qualified and technical experts, which include the majority of that class in this country.

What these conferences effected in the work of classifying fire-resistive construction and standardizing methods of conducting fire tests forms an advance in practice probably more important than any forward movement which has been made in several decades. The National Fire Protection Association acted favorably on the report of its committee at the annual meeting last month in Washington (see May, 1917, issue of CONSTRVCTION). The American Society for Testing Materials will receive the reports of the conferences for action at its annual meeting during this month at Atlantic City, and the other bodies will also doubtless take official action in due course.

### Sympathy of Federal Government

It will be seen that the United States Bureau of Standards was represented at the conference. The bureau has called into existence an Advisory Committee on Fire Tests of Wall Construction. This committee has already acted tentatively in a similar manner on some of the fundamental questions considered and acted upon at the conferences. Thus it is evident that the United States Government is disposed to co-operate and harmonize its practice with the classification and standardization of methods put forward by the conferences.

What has been set forth in this article justifies the opportuneness of our having now explained the progress made towards a National Building Policy.

It will be seen that this progress has reached a point where it becomes necessary that our national policy be now stated in definite terms, so that cross purposes may be avoided and all workers may co-ordinate their efforts and urge its general acceptance and use.

How, in the opinion of CONSTRVCTION, the ambitious program set forth in the above can be attained will be set forth in the next issue of this publication.

## *Quality in Building Construction*

AN impressive lesson in building, says *The American Roofer,* is afforded by a visit to the suburbs of any great city. Within the past ten years a great change has taken place—a change for the better. In place of unsightly frame houses substantial brick and stone bungalows and two-flats are now to be seen. The mushroom growth of the past has given way to a solid march of substantial improvement that stands for permanence as well as beauty and utility. In suburbs where formerly the development was along the line of the cheapest possible construction the best is now the rule.

What does this signify if not that builders and the buying and renting public have come to an appreciation of quality in building construction? It is no longer a question of how cheap but how good. From now on architects are going to scrutinize materials and weigh contractors with greater discrimination. The best is going to win over the cheapest.

This development is working out along the lines so often advocated in these columns in the matter of the manufacture of roofings.

# Structural Conditions at Toledo, Ohio

WHILE the municipal building laws of Toledo, Ohio, "contain many provisions of value," in the opinion of the experts of the National Board of Fire Underwriters, "they are somewhat deficient regarding heights and thickness of walls and notably inadequate regarding areas, openings in floors and requirements for standpipes and automatic sprinklers." Again, "the hazard of shingled roofs is not guarded against and the laws are deficient in several other important details."

Within the congested district of the city, the engineers report: "There are 23 fireproof and 2 semi-fireproof buildings; 8 have steel frames and 6 are of the reinforced concrete type; enclosing and curtain walls of brick, with floors and roof of concrete or concrete and tile, are the rule; 8 have brick bearing walls, with floors and roof of similar construction. In a few instances exposed steel work was noted; light curtain walls of excessive height and considerable amounts of interior wooden trim form additional weakening features One building has a temporarily wooden roof. The semi-fireproof buildings have brick bearing walls, with all steelwork unprotected. They are mainly occupied as office, bank and mercantile buildings, but other occupancies include hotels, a freight house, shoe factory, a powerhouse and a telephone exchange. Eighteen buildings are 6 stories or under, one is 8 stories, two are 10 stories and four are one each of 11, 12, 16 and 21 stories, respectively. Areas are mainly large or excessive. The largest are a 3-story semi-fireproof powerhouse, of 43,700 square feet, and a sprinklered 8-story hardware establishment of 34,000 square feet.

### Window Protection

"Exposed windows are protected in ten buildings and partly protected in three. In two buildings communications are protected; they are partly protected in two and unprotected in a like number. Most skylights are of wired glass. Four buildings are sprinklered throughout and a theatre has sprinklers over the stage. Six buildings have inside standpipe and hose.

"Six buildings are of the mill type of construction, mainly non-standard. Two are three stories, one is four stories and three are five stories. Only one area exceeds 10,000 square feet; this is a sprinklered five-story drygoods establishment of 12,000 square feet. Vertical openings are protected in four buildings and partly protected in one. Four buildings have exposed windows protected and one has them partly protected. Two buildings are equipped throughout with automatic sprinklers and one has an inside standpipe and hose.

### Joisted Brick Construction

"Five hundred buildings are of joisted brick construction; 74 per cent are three stories or under, 23 per cent are four and five stories and the remainder are higher, the highest being two of eight stories; of the total area covered by this type of construction 65 per cent is in fire areas exceeding 5,000 square feet and including twenty-one separate fire areas exceeding 10,000 square feet. The largest are a sprinklered four-story department store of 35,500 square feet, a sprinklered five-story drygoods establishment of 27,000 square feet, a two-story mercantile and a theatre of 22,900 square feet and a five-story hotel of 21,200 square feet. Unprotected or poorly protected communications form large or excessive areas in twenty-eight cases; the largest are a group of sprinklered four-story department store buildings, including the excessive area department store previously noted, of 40,900 square feet, a group of mainly sprinklered brick and from 1- to 4-story wholesale grocery buildings, including an excessive area of 33,900 square feet and a group of 3-story mercantile and office buildings of 19,500 square feet. Ten other communicating groups have total fire areas averaging 14,000 square feet.

### Unprotected Communications

"In buildings of this type communications were found protected in twenty-four cases, partly protected in twenty-six and unprotected in fifty-two. Vertical openings are protected in twenty-five buildings and partly protected in thirty-four; two have open wells and a like number have open stairways. Of the buildings exposed within 50 feet, ninety-two have windows protected and twenty-eight partly protected. Walls, although of fair thickness, are often of questionable integrity and fire and party walls are mainly 4 inches and occasionally 8 inches too light; many cracked walls were noted. Parapets are low and frequently lacking.

### Automatic Sprinkler Protection

"Fifty-three buildings are protected throughout by automatic sprinklers and two are partly protected; three have outside standpipes and twenty-two have inside standpipe and hose.

### Wire Glass and Metal Frames

"Including all classes of construction, less than 20 per cent of the skylights are protected by wireglass or external screens; the others are mainly heavy glass in metal frames. Fire or party walls are present in 80 per cent of the total number of buildings; these are mainly 4 inches too light. Standard protection to floor openings is lacking in 25½ per cent of the total number of buildings and 60 per cent of said number have un-

(*Continued on page* 295)

### A Department Devoted to the Use of

## AUTOMATIC SPRINKLERS

Edited
**IRA G. HOAGLAND, Secretary** **PAUL MASON, Special Representative**
*National Automatic Sprinkler Association*

# Automatic Sprinklers for Basement Protection

FOUR lives and a property loss of about a quarter of a million dollars!

These constitute the price Manchester, N. H., recently paid for lack of automatic sprinkler protection in the basement in one of its mercantile, industrial and office buildings.

There are other items and factors of cost for this neglect, also paid and to be paid; but these two—an indefensible and terrible tax on life and property—dominate the story of a fire that, developing among open joists over the furnace in the basement of a combined mercantile, office and apartment building, took its toll of life and wealth within an hour or two, besides entailing a long and impressive train of heavy consequential loss and damage.

An effort to encourage basement sprinkler protection through a bill introduced in the New Hampshire Legislature last winter was not successful, as it was thought that to install sprinkler protection would put an undue financial burden on the property-owners.

How much this short-sighted policy has cost Manchester is graphically set forth in the story of the fire.

Fire in an unprotected basement spreading rapidly through a four-story merchantile, office and apartment building in Manchester cost four lives and the destruction of nearly a quarter of a million of property in the early morning of May 13, 1917. Among its features were many hair-breadth escapes and thrilling rescues by firemen; but the outstanding, pre-eminent feature is that public authorities ignored the need of adequate equipment for the automatic discovery and extinguishment of basement fire—the most dangerous of all ordinary fires.

In this fire, as many other cities in many other fires, Manchester has paid with blood and treasure the price of neglect to pay the cost of prevention. Now, because the new building to be erected on the ruins of the old must conform to certain established standards of safety, it must also pay the cost of cure, because it would not pay the cost of prevention. In other words, Manchester must pay twice as the price of its own dereliction.

The fire, in the Weston and Fitts block in Elm street, in the heart of the business district, evidently developed about or soon after Saturday midnight, and after smoldering for a time among the joists above the furnace, where it started, spread, unseen and unchecked, through the hollow spaces in the walls; for when the first alarm was given, at 1.32 A. M., flames were bursting from nearly all windows on all floors. *Firemen,* aroused from sleep by the muffled explosion of heated air and gases that preceded the burst of flame, *were sliding down the poles* to the apparatus *when the first alarm tapped in.* Ten minutes later the third alarm, calling the city's fire-fighters and equipment to the scene, had been given.

### Narrow Escape of Occupants

With the arrival of the firemen the work of rescue began. Only five of the 40 persons trapped in the two upper floors were able to escape, finding a precarious exit and way to safety over the roofs of adjoining buildings to the side windows of a higher building beyond. Men, women and children hung from window ledges until ladders could be lifted to them. All stood fast until every ladder in the department was in service, and all except three of the known occupants were assisted or carried to the ground by willing and daring firemen. These three, however—two men and a woman—overcome by the heated and asphyxiating gases, were burned to unrecognizable masses of charred flesh and bones. The fourth victim, a man, rescued with his family by firemen, collapsed from heart failure a few minutes later and died before the fire department surgeon, already at the scene, could reach him.

### Price of Municipal Neglect

Thus these four made the first and supreme payment on the cost of the city's neglect.

Loss of property was heavy. The building was valued at $125,000; stocks of merchandise in the four stores at $100,000 more, and equipment of offices on the second floor and personal property of occupants on the third and fourth floor swelled the aggregate to substantially $250,000.

This is the second item of payment in order of importance toward the cost price of Manchester's neglect.

The third item is in the interruption of business of the four large mercantile firms occupying the first floor and that of the professional men—doctors, dentists, lawyers, etc.—on the second floor; and making bad matters worse is the loss of equipment, books, records, valuable papers, etc., the value and aggregate cost of which cannot be computed. Illustrating this phase, one of the burned-out firms advertised as follows in Monday's Manchester *Leader:*

"We regret to announce that our store was gutted by the fire in the Weston and Fitts Building Sunday morning, and shall be obliged to be closed for a few days."

It is exceedingly conservative to estimate that this consequential loss at least equals the direct loss by the fire. If, as the result of the blaze, these firms lose many of their old customers, as well as many of their book accounts, this loss will never be made good as long as they continue in business.

The fourth item in the cost falls on the owners of the burned building. That structure was valued at $125,000. At the present price of building materials it could not be duplicated for many thousands—tens of thousands—more. But the city will not permit the old hazardous structure to be duplicated, the old methods of structural menace to be followed. Since the Weston and Fitts block was built, in 1892, the city has passed a fire limit ordinance and enacted a building code that will compel the erection of a virtually fire-resistant building, which will add still more heavily to the cost.

Even if a building as nearly fire-resistant as possible is put up, it will be a mistake if the basement is not sprinklered; but the added cost of the new building, sprinklered or unsprinklered, will be many times the cost of a sprinkler system for the basement of the old block, if that had been installed, either voluntarily or by compulsion.

### Two Views of "Financial Burden"

*And the reason advanced to induce the State Legislature not to vote for this form of protection was that it would put a financial burden on the property-owners.*

That financial burden, if such a thing existed, would have been small compared with the financial burden—as well as the cost in lives lost—now weighing on not only the owners of the building, but also the occupants and the entire city. It would have been an infinitesimal price to pay for safety. In this instance the thing which would have assured safety—as well as ultimate economy—was denied because of "undue financial burden."

Against all these costs—the price it pays—Manchester will score one gain if the block is rebuilt. It will be a fire-stop instead of a fire-breeder. But it has paid too heavy a price for the improvement.

### Views of Fire Chiefs

Fire chiefs of the United States and Canada generally desire the sprinklering of basements and sub-basements. Basement fires usually start unseen and spread—for a time at least—without detection. Lack of ventilation, or means of ventilation, makes it all but impossible for firemen to enter and fight a basement fire. About all they can do is to chop a hole in the floor above, put in a cellar pipe and start the water, trusting to luck that some of it will reach the seat of the blaze. If the walls are of hollow construction, without fire-stops, there is virtual certainty that every hollow space is serving as a flue to carry the fire to all floors.

This happened in the Manchester fire; and when the accumulation of heated air and gases expanded beyond the capacity of its containing ducts, there came an explosion that aroused the firemen in an adjoining block from their beds to find flames bursting from all four floors of the fated building. *If there had been sprinklers in the basement,* with the area over the furnace protected, *it could not have happened.*

In this connection it is worthy of note that a film fire in Indianapolis, that caused the loss of six lives, injury of many persons and destruction of $50,000 of property in April, also was a basement fire, in an unsprinklered building altered from an old residence and enlarged for office and apartment occupancy. Indianapolis has an ordinance requiring automatic sprinklers or perforated pipes at the ceiling of each story below the first or grade floor of buildings in which goods or merchandise are stored, but not in buildings like the one that burned.

Atlanta, which recently went through a disastrous conflagration, has a basement sprinkler ordinance, but the fire chief has been unable to enforce it because of lack of official co-operation and supporting public sentiment. Inasmuch, however, as its automatic sprinkler system saved a large steam laundry directly attacked by the conflagration, Chief Cody sees an awakening of public interest, as the result of which he expects to bring about general installation of basement sprinklers.

The attitude of Chief Cody toward basement sprinklers is typical of the attitude of fire chiefs throughout the country. The chiefs know the value of sprinklers, particularly in the control of basement fires, and are eager to have them; but too often official inertia or the unwillingness of building owners to invest relatively small sums that will not only furnish protection but will pay financial dividends as well, prevents the accomplishment of their desires in this direction.

Former Chief Frank E. Henderson, of St. Louis, in a discussion of sprinklers at the Cincinnati Convention of Fire Chiefs, declared that if he knew every basement in the congested district of St. Louis was sprinklered he would be able to sleep nights—an opinion echoed by a dozen chiefs who participated in the debate. Director of Safety C. E. Swingley, of St. Louis, also emphasized this point.

Chief John Kenlon, of New York, declaring the automatic sprinkler the "*the most scientific method of fire fighting known,*" has repeatedly emphasized the necessity of basement installations before various sessions of the Chiefs' Association, and lays heavy stress on it in his book "Fires and Fire Fighters."

Basements are prolific breeding places of fires—even of conflagrations. Early in 1916, fire started in the basement of the Steiger Department Store, Fall River, Mass., caused a loss of upward of a million and a half. A sprinkler system had been assembled for installation at the point of origin, but actual work had not been begun. "The building was peculiarly adapted to the spread of fire," said Deputy Chief Neal of the State Police; "buildings of that character should be equipped with sprinklers."

The Bon Marché, a great department store at Seattle, Wash., was threatened with a similar visitation in November, 1915, but the resulting loss was trivial, because the building was sprinklered. Fire started in the basement about 1 o'clock in the morning. The watchman smelled smoke and turned in an alarm, but *when the fire department arrived the automatic sprinklers had extinguished the blaze.*

The fire started in excelsior, in the packing and shipping department. The building was of large area and contained combustible structural material and very combustible contents. The loss was less than $25. "If the automatic sprinklers hadn't been installed," said Battalion Chief Clark, who handled the fire, "I hate to contemplate the ruin we might have been facing on one of the busiest corners this morning."

Not only do automatic sprinklers provide safety to life and property, assure stability of business and act as the most perfect auxiliary for fire departments in the fighting of basement fires, they also yield material financial advantages to owners and occupants of buildings through the reduction of insurance rates. Of course, reductions, due to basement sprinkler systems, are not as considerable as they are for full equipments in buildings. All rating bureaus allow some credit for basement sprinklers.

### Cost of Installation Relatively Small

As the basement sprinkler system may be installed at relatively small cost, it may easily be seen that, all conditions being favorable, the insurance savings may constitute a factor of moderate financial profit, while the installation itself is an almost certain assurance of safety to life and property, of business stabilized by freedom of interruption by fire, of continued employment of employees, and—to the fire department—that its members will not be compelled to fight a fire blindly in a dark and smoke-filled cellar, with every advantage in favor of the fire.

So Manchester ignored an opportunity to assure safety with respect to basement fires and to acquire profit therewith—an action for which it has paid in lives lost and property destroyed, and is paying in interruption to business, increased cost of replacement, loss of taxes by the municipality, loss of employment and wages by employees of the destroyed stores. Manchester may learn the lesson, but there is little ground for hope that other municipalities will elect to learn from Manchester's experience. Probably they will wait until the experience is theirs also—an extravagant and sometimes a murderous way to acquire knowledge.

## Fire Hazard at Toledo

(*Continued from page 292*)

protected windows exposed within 50 feet. Based on National Board requirements, 50 per cent of the buildings which should be so equipped are provided with fire escapes mainly of the stair and balcony type; a few of the fireproof and mill buildings have enclosed stairs; otherwise modern types are lacking. Chemical extinguishers or fire pails are provided in seventy-four buildings.

### Frame Structures

"The frame construction largely consists of small dwellings, stables, sheds and additions; none exceeds three stories in height. Areas are mostly small, but four exceed 5,000 square feet, the largest of which are a one-story metal-clad freight house of 9,900 square feet, and two one-story warehouses of 7,300 and 7,000 square feet, respectively. Three small additions are sprinklered. Eight buildings are metal-clad and one is brick-veneered; twenty-six buildings and sheds have shingle roof."

*No better form of protecting the contents of a building against fire was ever denied than automatic sprinklers.*

# SAFE HOMES

***Edited by*** **RALPH P. STODDARD, Secretary**
**Society Advocating Fire Elimination**

## *Comparison of Costs in Home Construction*

CLEVELAND, Ohio, has furnished an unanswerable argument for safe home construction.

In one of its suburbs a group of houses were built of firesafe materials and sold at exactly the same price as those identical in size and design built of frame.

These operations were carried on by three different parties—on lots costing each $1,000—proving that anyone desiring a home of safe construction can have it at no greater cost than one of inflammable materials.

The houses are exact duplicates as to size, arrangement, interior finish and equipment. All have permanent and fire-resistant roofs. This offered a perfectly fair comparison between the various types of exterior walls, the only respect in which the houses differed. Final figures disclosed the fact that the cost varied so slightly that the selling prices were identical.

**Built of tile and brick. Sold for $4,900**

Four types of construction are represented in this group of houses. The first was of hollow tile, faced with brick. This house was built to sell by the Brick Homes' Company. It was disposed of before being completed for $4,900.

This company's second operation was a house of hollow tile, faced with stucco. This latter building was erected some months after the first, during which time labor and materials advanced so that its cost was $300 more than the first. This increase was divided among all the sub-contracts; in fact, the percentage of advance on the mason work was smaller than on most others.

**Tile and stucco construction. Sold for $5,200**

While these operations were going on, a frame house was built from the same plans by J. A. Higbee, general manager of the Conelly Company, upon whose allotment all the buildings were constructed. After occupying it for a short time, Mr. Higbee disposed of his home for $4,900. Its cost was practically the same as its counterpart in brick.

Late last fall, a contractor, Andrew Pentland, purchased one of the lots in this sub-division and erected upon it a house framed of wood, covered with wire-lath and faced with stucco. This type of construction, while not in very general use, gave excellent results and he found the cost was such that his selling price was set at $4,900. It was sold at that figure.

The fact that these houses were built and sold on equal terms with those of frame has resulted in a sentiment in favor of safe construction in this district. Buyers are demanding it; and already five houses, besides those already mentioned, have been erected upon this allotment. With the character of these houses thus established, the allotment managers predict there will in the future be few houses of frame construction built upon it.

A study of the plans shows that this little house is an average six-room home, such as is being built by hundreds in all parts of the country, and is one that would offer no structural difficulties to any builder. It

Frame exterior. Sold for $4,900

Built of lath and stucco. Sold for $4,900

shows an exceptionally good utilization of space, so that none is wasted, while all rooms are of good size and thoroughly livable.

The summary of costs is an added argument for safe construction. The carpenter work, which is limited almost entirely to the interior, totals nearly as much as all the mason work, foundation, walls, chimneys, porches, etc. The smaller trades, such as plumbing, wiring, heating, tinning, slatting and plastering, showed variations of but a few dollars on the various houses.

Following is a bill of materials for exterior walls of these houses:

#### 25 x 26 Stucco on Tile

| | |
|---|---|
| 4,500 | 5 x 8 x 12 |
| 900 | 5 x 4 x 12 |
| 2,800 | face brick |
| 4,000 | common brick |
| 12 | yards sand |
| 31 | sacks cement |
| 72 | sacks lime |
| 3½ | tons Klingstone base coat |
| 2 | tons Klingstone grey finish |
| | (Furring 1,700 square feet, $34) |

Labor on above at 75 cents per hour, except furring, which is included in price of $34. Common labor 45 cents per hour, $315.50.

#### 25 x 26 Brick Veneer over Tile

| | |
|---|---|
| 1,500 | 5 x 8 tile |
| 3,500 | 5 x 4 tile |
| 4,000 | common brick |
| 11,000 | pressed brick |
| 20 | yards sand |
| 50 | sacks cement |
| 1,000 | sacks lime |
| | (Furring, $34, includes labor) |

Labor on above at same rates as stucco, $407.

#### 25 x 26 Frame

| | |
|---|---|
| 1,500 | 5 x 8 x 12 tile |
| 900 | 5 x 4 x 12 |
| 2,500 | face brick |
| 2,500 | common brick |
| 1,800 | ft. st. 8 shiplap sheeting |
| 1,900 | ft. bungalow siding |
| 112 | 2 x 4 x 18 ft. |
| 6 | yards sand |
| 18 | sacks cement |
| 36 | sacks lime (hydrated) |

Labor on above, $305.85. Painting, $35.

#### 25 x 26 Stucco (Framed Bishopric Wall Board)

| | |
|---|---|
| 1,500 | 5 x 8 x 12 tile |
| 900 | 5 x 4 x 12 tile |
| 2,500 | face brick |
| 2,500 | common brick |
| 17 | rolls bishopric board (no waste in laps and sawing to meet 2 x 4 inches at joints) |
| 112 | 2 x 4 x 13 |
| 6 | yards sand |
| 18 | sacks cement |
| 36 | sacks lime |
| 3½ | tons Klingstone base coat |
| 2 | tons Klingstone grey finish |

Labor on above, $294.92; no painting.

The above figures are for the outside walls only, but include the chimneys, which are the same in each case. The drain tile, front and rear steps, sidewalks, cement work, waterproofing, below grade, interior finish, windows, doors, excavating and grading, fixtures, decorating and sub-trade contracts did not vary in price more than $15.

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Through the activities of the Society Advocating Fire Elimination the gospel of proper home building has made great progress in and about Cleveland, a considerable percentage of the residences erected in the past year or two being of the firesafe type. The results have been thoroughly satisfactory to all parties concerned, particularly to the home owners, whose appreciation of the safety of their property from fire and excessive depreciation becomes steadily more pronounced.

# JOHNS-MANVILLE
*Transite*
# ASBESTOS SHINGLES

**The Answer to Every Home Roof Problem**

SOME home builders are not "roof-conscious." They are guided by precedent instead of judgment. They accept a roof instead of choosing it, and save their judgment and good taste for less important details of the home. Then along comes a leak, a staining charge, a patching bill, or a nearby fire—and too late they see their roof in its true importance.

Thoughtful people, accepting the shingle as the best home roofing, choose a particular type. They find there are fire-proof shingles that are moderate in first cost, good-looking, light in weight, and that require little if any repair. And so they demand Johns-Manville Transite Asbestos Shingles, whether their homes are large or small, modest or pretentious.

Get the details from our booklet, sent free wherever you say. And consult your architect—have him specify Johns-Manville Transite Asbestos Shingles.

Johns-Manville Roofing Responsibility protects the user of our shingles, just as it protects the user of any Johns-Manville Asbestos Roofing. You may register your roof with us and thus make it our obligation to give the full service promised.

Johns-Manville Transite Asbestos Shingles are examined, approved and labeled by the Underwriters' Laboratories, Inc.

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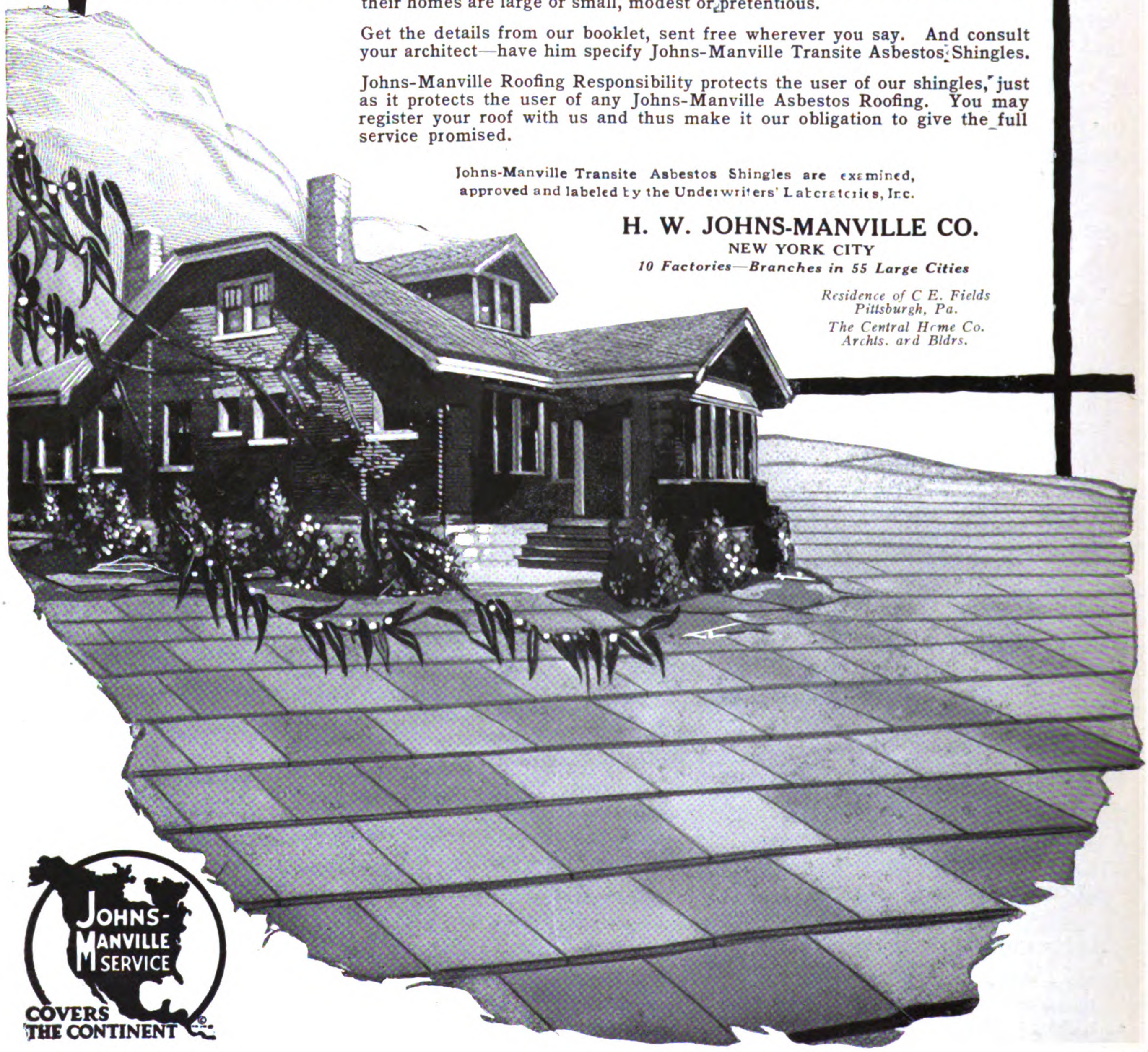

*Residence of C E. Fields*
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JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

**WEATHER:** Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

# The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

**LATEST EDITION**

Copyright by Construction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., June, 1917

**Priceless**

## SPRINKLERS SCORE IN ATLANTA CONFLAGRATION

ADDITIONAL evidence — if such were needed—as to the protective value of automatic sprinklers was supplied during the sweeping conflagration at Atlanta, Ga., on May 21 last. The plant of the Trio Steam Laundry, though directly in the path of the flames, was saved from destruction through the efficient work of the Globe Automatic Sprinkler service with which the building was equipped.

The admirable work of the sprinklers is told by an observer in the following language:

"Saved by automatic sprinklers! This is the brief, concise and illuminating story of the real bright spot in the conflagration that swept over Atlanta, Ga., Monday, May 21.

"'The Trio laundry went through the great fire unharmed!' declared an advertisement published by the laundry company in an Atlanta paper after the fire had passed. 'The automatic sprinkler saved these buildings, which were in the very path of the fire.'

"In another advertisement, published before the last embers of the conflagration had been extinguished, the laundry management told the people of Atlanta:

"'The Trio laundry saved by the Automatic Sprinkler System! Nothing burned; will operate Tuesday morning as usual!'

"The fire broke into the building through the plain glass windows in ordinary sash and frames; but the sprinklers opened promptly, extinguished the blaze and business was resumed the next day. Loss on contents (water damage) was only $1,638; that on the building (exposure fire) was less than $6,000! The combustible contents were a safer risk than the building!

### Stability Insurance

"Thus it is clearly demonstrated again by this fire, as so often in the past, that automatic sprinklers not only save buildings and protect contents, but that, in a time and situation like these, they are the only assurance of stability of business—no interruption by fire, even when it is a fire of first magnitude.

"Moreover, the Trio laundry plant was the first of a group of fairly substantial brick buildings, with non-combustible roofs, but with unprotected windows, directly in the path of the flames. They were not particularly menaced by the flying-brand hazard, as were the shingle-roofed buildings beyond them, but were liable to successful attack on front and flanks by direct exposure through their window openings.

### In the Lee of Safety

"The other buildings in the group, lying behind the Trio laundry with respect to the march of the conflagration, were not sprinklered. It was fortunate for them that this building was attacked, rather than themselves. With the fire extinguished by sprinklers in the laundry building, it became a substantial fire-stop for them, and it was not until the far buildings in the diagonal corner of the block were reached that the conflagration in this locality resumed its progress.

"Thus it is seen, in this fire as in many others, that an efficient automatic sprinkler system not only protects buildings and contents and controls conflagration conditions, but that it also, with respect to certain buildings or groups of buildings, may stop the onward march of a conflagration itself."

◆

*"Bliggins' small boy says a great many bright things.*

*"He uttered his masterpiece the other evening in the presence of a large company."*

*"What was it?"*

*"He said, 'Father, where do you get all the funny things you tell people I say?'"*

## USE MOTION PICTURES

Last Spring the Underwriters' Laboratories, of Chicago, had made a new fire protection moving picture, which was intended to be loaned to insurance men, public officials and others for use in educational campaigns. The picture, which is a two-reel subject, entitled "An Unbeliever Convinced," has been so well received that fire chiefs who have seen it have asked to be allowed to feature this film on certain days in theatres where admission is charged, and to contribute the funds thus obtained to the local chapter of the Red Cross.

◆

## NEW MILL OF U. S. GYPSUM COMPANY

To more promptly and satisfactorily serve its customers in the Northwest the United States Gypsum Company has opened a mill at Piedmont, S. D., of modern construction and fireproof throughout; the new mill is electrically equipped with the latest approved machinery.

"The new Piedmont property," to quote "Rock Products," is unique in that it produces both gypsum or white plaster and gypsite or dark plaster. The Piedmont deposits were selected after a most exhaustive inspection of the properties in the Northwest. The gypsum rock at Piedmont is said to be unexcelled in purety, and the company states that the gypsite beds are the purest that have been discovered anywhere, not excepting the celebrated Oklahoma deposits. There is said to be sufficient gypsum and gypsite at Piedmont to supply the trade of the entire Northwest for a generation.

"Besides the mill at Piedmont, the United States Gypsum Company operates mills in the Northwest at Fort Dodge, Ia.; Denver and Loveland, Col.; and Blue Rapids, Kans. It has several other properties in process of development.

## UNDER FINE HEADWAY

Addressing the field force of the Safe Cabinet Company, of Marietta, Ohio, the management of that progressive corporation, in its house organ, "Ammunition," says, in part:

"We have just closed the most successful era in the history of the Safe Cabinet Company. Our business for the five months ending May 31 has surpassed by far the results previously obtained by our organization in any equal length of time.

"You have accomplished the goal set for you at the first of the year, as our records show that you have doubled your Safe Cabinet business as compared to the corresponding period last year.

"Reports reaching us from every center, and the information gained on recent visits to many of our stores, prove beyond doubt that this is but the beginning of much greater things to be accomplished by you in the months to come.

"Everywhere we go we find our dealers bubbling over with enthusiasm—everyone is taking a real active interest in the sale of the Safe Cabinet. Everyone knows more about our product and why it is the best protection in the world for business records and valuable data.

"We appreciate sincerely all that you have done. Your success is due entirely to your untiring efforts and spending more time in the presence of your prospects."

◆

## BRICK CONTRACTORS

Incidents happening in the trade now and then have given rise to this question: "Do we need more men trained in the art of brick contracting?" The brick industry has given much thought, time and money to the training of young men for the work of laying brick, and they have still room for further effort along this line with good results. Meantime what about the brick-contracting business?

In one city of fair size, where a suggestion was made that the brick men secure the co-operation of brick contractors in a campaign of advertising, the brick men complained that there were but few contractors worth while, that is, contractors engaged exclusively in the brick business. It seems that many of the contracts taken for brick work were taken by lumbermen and carpenter contractors, who simply sublet the brick work to brick layers.

Some further inquiry developed the fact that almost any carpenter contractor gives quite a lot of his time and attention to the matter of estimating, making plans and interpreting plans, to rendering assistance in many ways to the prospective builder, whereas too many of the so-called brick contractors are nothing more nor less than brick layers, know but little about the science of estmating, and are not able to render much assistance to the prospective builder in the work of shaping the details of his plans and choosing designs for his building.

It is not only possible, but seemingly very likely, that the trade has been overlooking something here which needs active attention, and that is a matter of encouraging the development in every practical way of more people qualified to do brick contracting. It is plainly evident that contractors in wood construction are not only more abundant in numbers, but they are more efficient in many ways, better qualified with the information about the details of construction, and are in a position to render more service generally to the prospective builder than brick contractors are.

Plainly there is room for the mobilizing and training of an industrial army in the division of brick contractors.—"The Clay Worker."

◆

## CONCRETE INDUSTRIAL BUILDINGS

A few of the many prominent industrial buildings erected by the Turner Construction Company, of New York city, are portrayed on Bulletin No. 20, lately published by the corporation. Specializing in concrete construction, the Turner company has developed a large business, its forces being employed upon buildings on many important centers throughout the country. To those figuring upon erecting industrial plants, a careful reading of Bulletin No. 20 should prove valuable.

## IMPORTANT TO PROSPECTIVE BUILDERS

Architects, contractors and builders know the many advantages of metal lath over wood lath and are using it extensively.

Realizing, however, that the average building owner is not educated up to the merits of this product, the Berger Manufacturing Company, Canton, Ohio, has issued an interesting non-technical booklet which explains the importance of building for safety and permanency.

This booklet emphasizes the advantages to the home owner in having Berger's Expanded Metal Lath used in his building. The chief advantages of this lath are:

"It reinforces the plaster over the entire surface, preventing cracking or falling; does not absorb moisture, hence cannot swell, warp or stain the plaster; fire resisting, greatly adding to the protection of a building; sanitary; decorations can be applied immediately after plaster is dry; vermin cannot make holes through the walls; muffles sound; and maintenance costs are practically eliminated.

PREVENT PLASTER FROM CRACKING IN Your New Building
The Berger Manufacturing Co.
Canton, Ohio

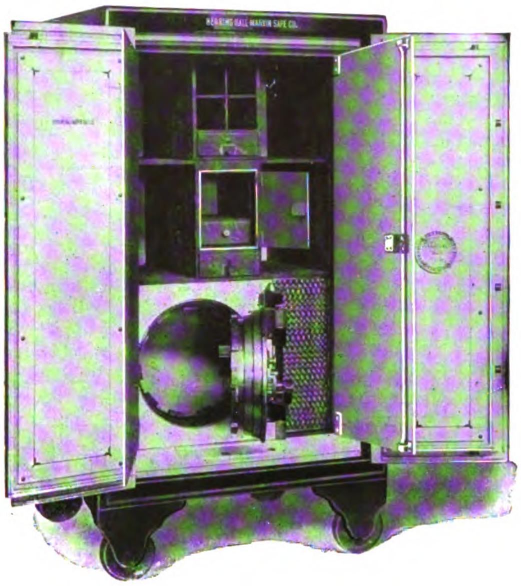
All these points are clearly explained in a convincing manner.

To add additional interest and value to this booklet, several pages are devoted to proper decorations of rooms, harmonies in colors, and easy methods of figuring amount of wall paper required for various-sized rooms.

A copy of this booklet will be sent on application to the Berger Manufacturing Company, Canton, Ohio.

# HERRING-HALL-MARVIN SAFE COMPANY

*Designers and Manufacturers of*



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Blackboard talks by the professor

No. 1—
Fire
Prevention

One home burns for every five built

"MY first talk will be on fire prevention. As you know, fire is the chief source of destruction we have to contend with. Statistics show that homes equal to 20% of the new homes built each year are destroyed by fire. The 1916 fire loss was about $96,000,000. Just think of that!

"You men can cut down these great losses by eliminating combustible materials, as far as possible, from the buildings you erect. For instance, instead of using inflammable wood lath, plaster your walls and ceilings on

**Berger's Expanded Metal Lath**

"Unlike wood lath, a Berger Metal Lath and plaster partition is fire resisting—a blaze occurring will be confined to the room in which it originates and can be extinguished before it gets beyond control and causes loss of property and possibly life.

"You should consider this fire-resisting feature in the buildings you erect. The owner wants his building safe and will gladly pay the slightly extra cost for the protection and permanency offered by Berger's Expanded Metal Lath.

"Use Berger's Expanded Metal Lath in your next building."

*Send for Free Booklet F. C.*

**The Berger Mfg. Co.**
CANTON, OHIO
BRANCHES:
Boston, New York, Philadelphia,
Chicago, St. Louis, Minneapolis,
San Francisco, Los Angeles
Export Dept.:
Berger Building, New York City, U. S. A.

## HOLLOW TILE ASSOCIATION IN SOUTH

To popularize hollow tile as a building product, a group of prominent manufacturers recently formed the Southern Hollow Tile Association, establishing headquarters at Birmingham, Ala. The organization will operate under the open price plan, the members exchanging information as to production, distribution and other important matters that will assist in determining market conditions. James T. Howington was chosen president of the new Association, A. D. Dabrey its acting secretary.

◆

## FLOOR TESTS IN SEATTLE, WASH.

Under the direction of the Building Department of Seattle, Wash., tests are being made of the floor slabs of the American Can Company's new building in that city.

The floors were designed to carry a load of 150 pounds to the square foot. Two wall panels are now loaded with sheet tin, subjecting the four-way flat slab to a pressure of 425 pounds, and the two adjacent panels are now being loaded, all standing the load successfully. The floors were designed by an official of the can company. As far as is known, the system of reinforcing is unpatented, though it probably has several patentable features, the principal one of which is the arrangement of the reinforcing so that the usual cracks which appear in four-way slabs are not apparent.

◆

George A. Olsen is the new secretary of the Chicago Building Material Exchange.

◆

What is reported to be the largest single order for wire mesh reinforcing ever placed in this country, was secured by Albert Oliver & Son, Inc., of New York city, a short time ago. The order calls for 1,500,000 square feet of Clinton Electrically Welded Fabric to be used in roof and floor construction of the Commodore Hotel, in process of erection, at Forty-second street, this city.

## INSTRUCTION IN CONCRETE WORK

The William Hood Dunwoody Institute of Minneapolis, in co-operation with the extension division of the Portland Cement Association, has just added a concrete course to others conducted in its trade schools. It is expected that lessons in concrete will be started about September 1, in both day and evening classes.

◆

The splendid increase in business, and the need for greater floor space and facilities for displaying Johns-Manville products, necessitated a change in location of the H. W. Johns-Manville Company at Pittsburg.

New and larger showrooms and sales offices were opened on the ground floor of the Westinghouse building, corner of Ninth street and Pennsylvania avenue. These new quarters provide ample space to accommodate the increasing business and are located in the heart of Pittsburg's business district within a few minutes' walk from the Union Station.

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*He:* "Not much. That's *your* insurance, not mine. I figure we can trim about all the other items so as to save at least $400 a year, and I'm going to take a hundred of that and buy another Postal policy while I can get it. You and the kiddies may be glad some day."
*She:* (thoughtfully) "I guess you're right at that, Jim."

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THE *real* husband always makes a liberal allowance for life-insurance whether his wife wants him to or not, but the sensible woman *does* want him to when she considers it seriously.

And whether times are hard or easy they both want the most protection possible for their money, and hundreds of them during the last decade have therefore been turning to the

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It is not alone the Company of Safety and Service but also of Saving, for you will find net cost low—lower than ever before—because the Postal's actual underwriting experience has enabled it now to make a

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***Besides these savings, the Company pays the usual contingent dividends, depending on earnings.***

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The Postal issues all of the standard forms, and operates under the strict supervision of the New York State Insurance Department and is subject to the United States Postal authorities.

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Remember: No agent will be sent to visit you. The Postal Life employs no agents; resultant commission-savings go to *you* because you deal *direct.*

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WM. R. MALONE PRESIDENT
THIRTY-FIVE NASSAU STREET NEW YORK

**Postal Life Insurance Company**
**35 Nassau St., N. Y.**

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The International **FIRESAFE** Building Publication

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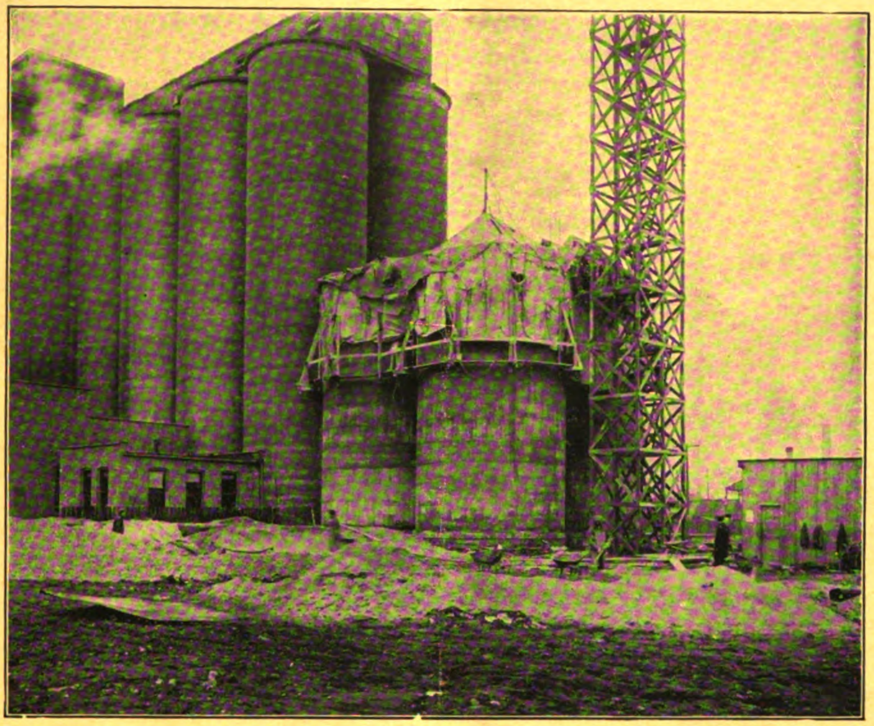

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Vol. IV FEBRUARY, 1917 No. 2

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*Proposed Building Code at Jamestown, N. Y.*
*Fighting the Fire Hazard at Rochester.*
*Logical Reasons for Firesafe Building.*
*Reinforced Concrete Construction.*
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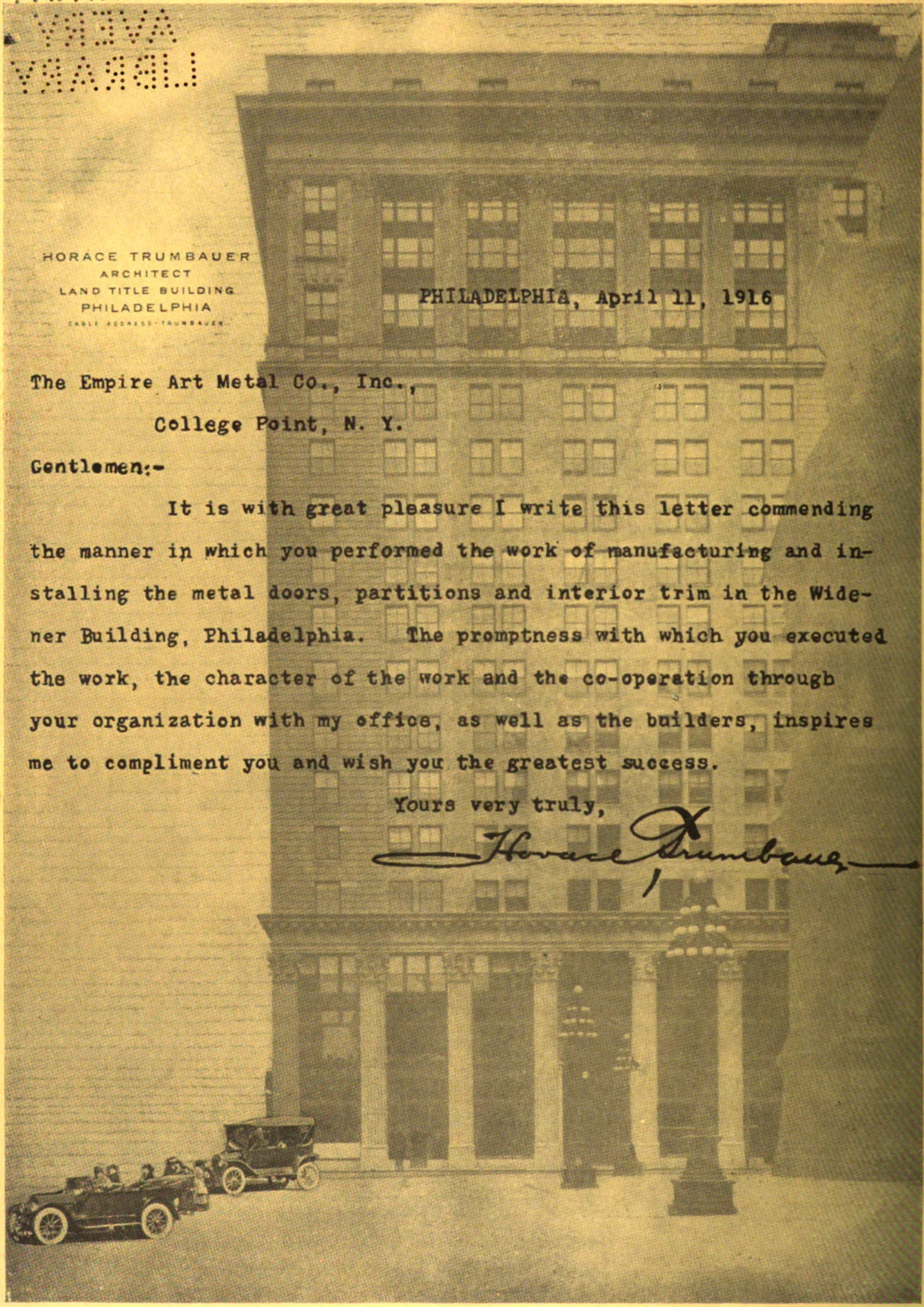

HORACE TRUMBAUER
ARCHITECT
LAND TITLE BUILDING
PHILADELPHIA
CABLE ADDRESS-TRUMBAUER

PHILADELPHIA, April 11, 1916

The Empire Art Metal Co., Inc.,
College Point, N. Y.

Gentlemen:-

It is with great pleasure I write this letter commending the manner in which you performed the work of manufacturing and installing the metal doors, partitions and interior trim in the Widener Building, Philadelphia. The promptness with which you executed the work, the character of the work and the co-operation through your organization with my office, as well as the builders, inspires me to compliment you and wish you the greatest success.

Yours very truly,
Horace Trumbauer

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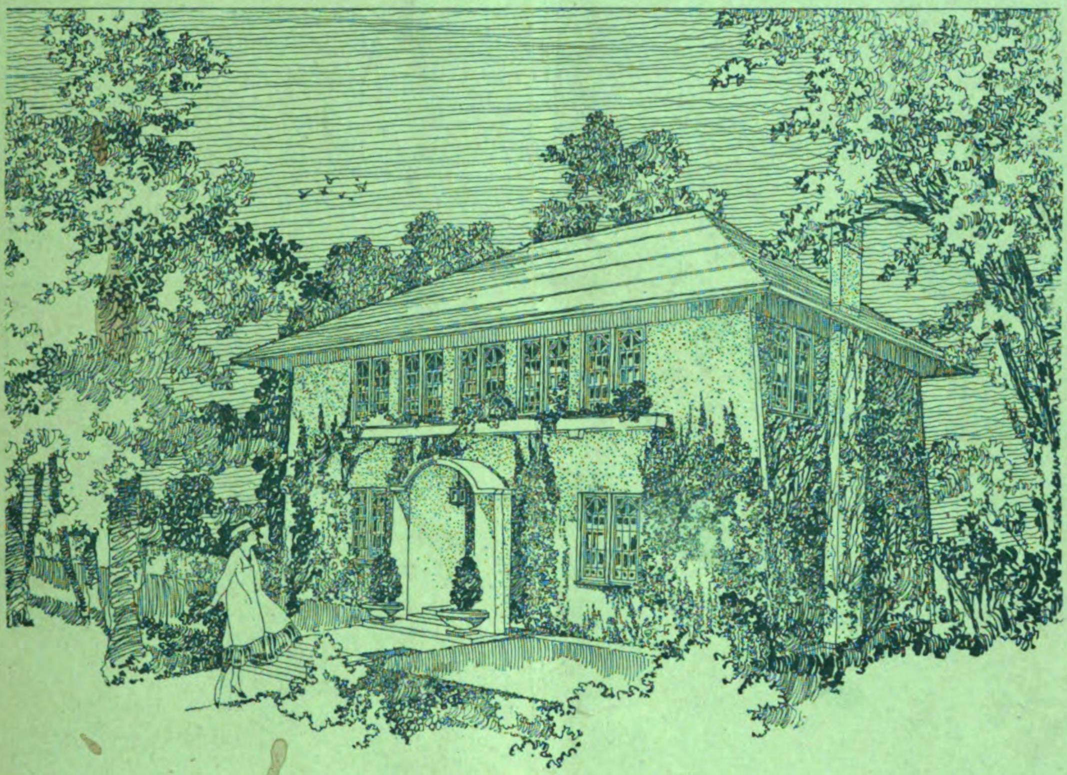
WITH A SPECIAL DEPARTMENT DEVOTED TO

## SAFE HOMES



Roof and Exterior of Fire-Resistive Materials—A Safe Home

Vol. IV. No. 3

MARCH, 1917

## *In This Issue*

***A Study of Fire Risks in a Business Section of Boston***

***Plan and purpose of The National Fire Resistance Council***

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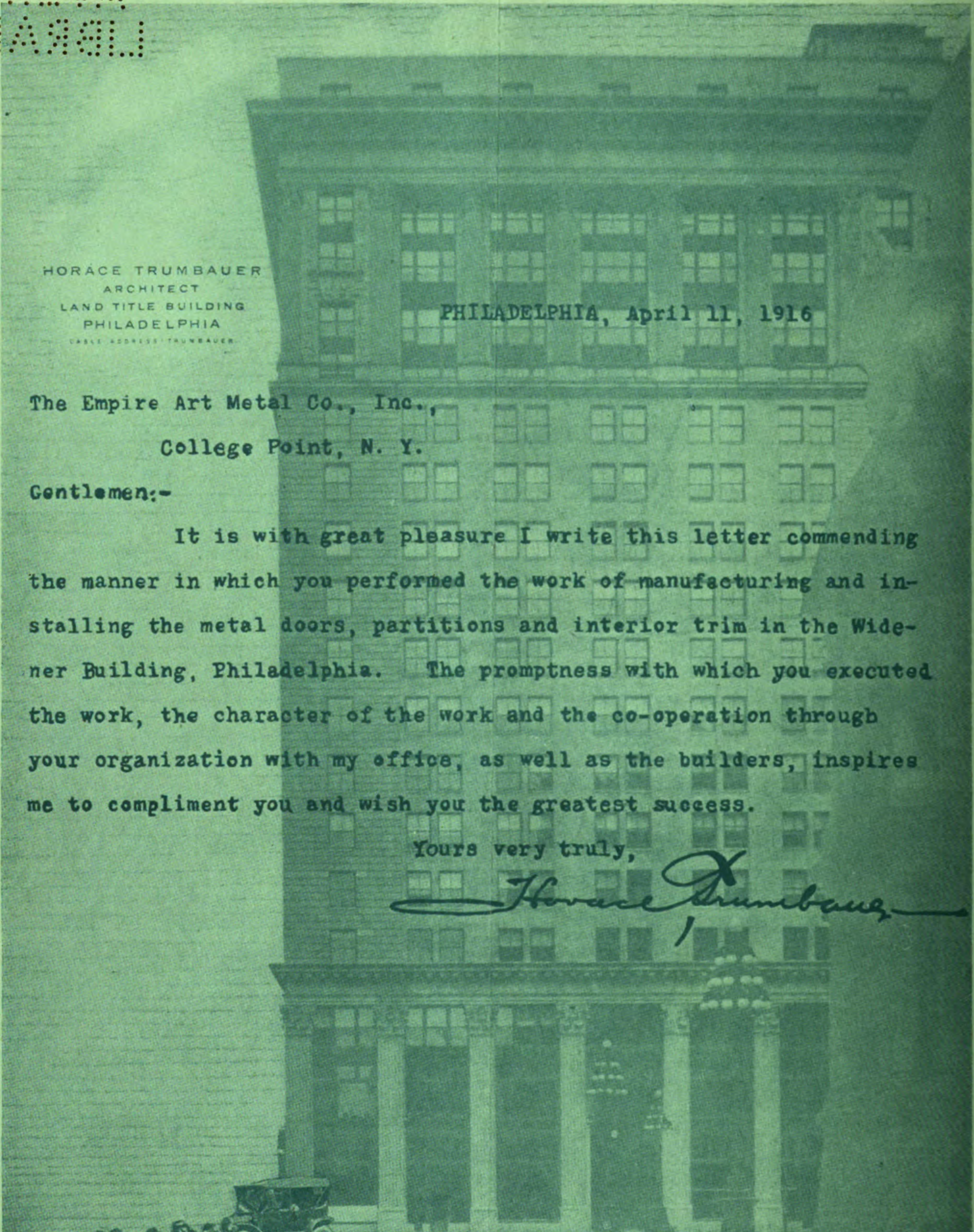

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JUNE 1917

VOLUME FOUR NUMBER SIX

A JOURNAL FOR ARCHITECTS, PROPERTY-OWNERS, CONTRACTORS, BUILDERS, UNDERWRITERS, FIRE PREVENTION ENGINEERS AND CITY OFFICIALS

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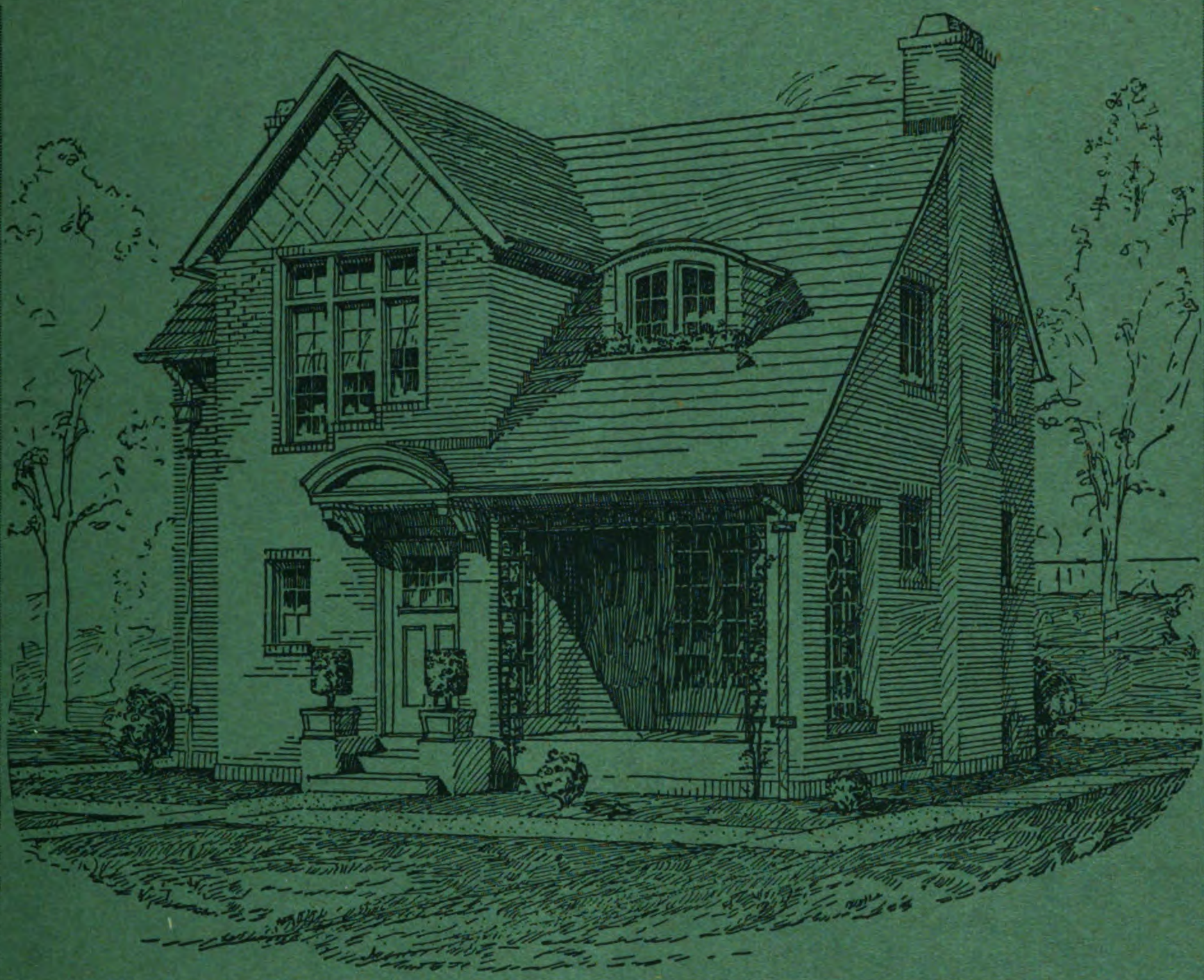

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